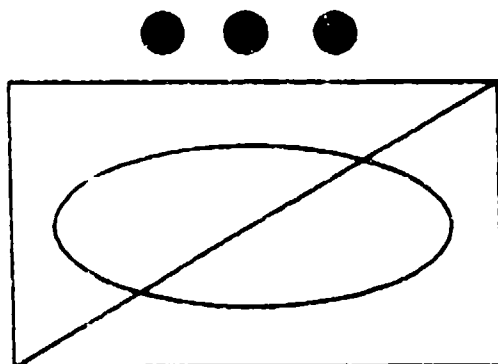


# PROPONENT EVALUATION REPORT

FOR THE

## CONCEPT EVALUATION

OF THE



## MANEUVER BATTALION SCOUT PLATOON

DIRECTORATE OF COMBAT DEVELOPMENTS  
U.S. ARMY ARMOR SCHOOL  
FORT KNOX, KENTUCKY 40121

12 MARCH 1990

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PROPOSED EVALUATION REPORT  
for the  
CONCEPT EVALUATION  
of the  
MANEUVER BATTALION SCOUT PLATOON

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PROPONENT EVALUATION REPORT  
for the  
CONCEPT EVALUATION  
of the  
MANEUVER BATTALION SCOUT PLATOON

1. Test Purpose: To provide information to the Commanding General, USAARMS, upon which to support a decision to reconfigure the maneuver battalion scout platoon. Specifically, the Concept Evaluation Program (CEP) test served to:

(a) Determine the operational effectiveness of two variations of the maneuver battalion scout platoon configured with ten vehicles and four surrogate military motorcycles (MILMO): one having ten High Mobility Multi-Purpose Wheeled Vehicles (HMMWV) and one having six HMMWV and four M3 Cavalry Fighting Vehicles (CFV); Appendix A.

(b) Determine the operational suitability of the two platoons relative to their:

(1) Employment tactics, techniques, and procedures; and,

(2) Organization design (structure, personnel, equipment). A, 4

(c) Compare the two 10-vehicle platoons with the current 6-CFV scout platoon. Appendix A. *10-vehicle platoons*

2. Description of Alternatives: The alternatives were two reconfigured platoons (10-HMMWV and 4-CFV/6-HMMWV) referred to as the "HMMWV" and "Mixed" platoons and the current 6-CFV platoon (base case). A number of added equipment items not organic to the current platoon were also evaluated, Appendix B.

3. Background: Four primary inputs supported the evaluation of the scout platoon variations: a front-end analysis (FEA) of previous studies and tests, a field validation, field training exercises (FTX), a focused rotation at the National Training Center (NTC), and a compilation of comparative analyses.

a. The FEA identified and summarized the results of relevant studies and tests, and provided perspectives on the historical evolution of the battalion scout platoon, and the means by which other armed forces provide "scout" support for maneuver battalions.

b. The two 10-vehicle variations of the scout platoon were equipped, trained, and validated at Fort Stewart prior to its deployment to the National Training Center.

c. The two variations were evaluated in a "focused rotation" format during their deployment at the NTC. Simultaneous to the NTC deployment, USAREUR evaluated a 10-HMMWV platoon of the 1st Armored Division at the Combat Maneuver Training Center (CMTC). USAREUR used the USAARMS format to simplify the integration of the results into this evaluation. USAREUR's effort was observed by USAARMS representatives.

d. A compilation of comparative analyses of the current platoon and the two variations determined comparative effectiveness relative to mission success, survivability, deployability, and various operating, training, and support impacts.

e. The following constraints, in some instances, affected the ability to provide decisive findings and conclusions:

(1) The CEP was not to interfere with the two battalion task forces' training schedule and NTC rotation. Consequently, any equality amongst the platoons relative to training, missions assigned, and leadership resulted as a matter of course rather than a controlled parameter.

(2) Resources precluded any on-site evaluation of the current CFV platoon. Many of the comparisons between it and the two 10-vehicle variations relied on historical data provided in previous tests, studies, and analyses.

(3) Only one of each reconfigured platoon was available for evaluation.

(4) Time, funds, and lack of controlled environment (personnel, terrain, weather) limited some evaluation aspects.

f. Limitations:

(1) The 10-vehicle platoons incorporated a considerable number of changes in mission equipment, each intended to correct a documented deficiency. Subsequently, many results represent the synergistic effect rather than the incremental effect, which was not always discernible.

(2) The number of iterations of each platoon per type of mission was predetermined by the unit command and the NTC control group.

(3) The uncontrolled parameters of personnel, terrain, and weather may not be representative of the spectrum of employment of the scout platoon which could bias the results.

(4) JANUS computer simulations which supported the comparing of operational effectiveness and survivability portrays "stealth" as a function of physical profile. Other stealth attributes could not be portrayed.

g. The risks associated with the above constraints and limitations are reduced confidences with some test results, biased results due to uncontrolled parameters, and the fact that some deficiencies or efficiencies may not have been revealed.

4. Front End Analysis Summary. The FEA encompassed three major subject areas intended to provide: a historical perspective on the evolution of the armor battalion scout platoon; an international view of armor battalion scout platoons; and, a comparative baseline of the current scout platoon.

a. Historical Perspective. Since 1941, the armor battalion scout platoon made three principal transitions from a mixture of wheeled and track vehicles to wheeled vehicles and then to tracked vehicles. The number of scout vehicles also varied considerably relative to the type of vehicle and the existing concept of employment. Table 1 summarizes this evolution which has been extracted from a stand-alone study to be published separate from this report.

Table 1. Evolution of the Armor Battalion Scout Platoon

		WHEEL	TRACK	MILMO	TOTAL
MIXED	1941	4	1	2	7
	1944	5	1		6
	1948	7	3		10
WHEELED	1957	14			14
	1959	15			15
	1964		8		8
TRACKED	1967		10		10
	1968		10		10
	1971		10		10
	1972		10		10
	1986		6		6



b. International View. A view of selected "international" armor force scouts and the U.S. Marine Corps is provided by Table 2. Noteworthy are the facts that: a majority of selected allied nations employ a scout platoon in support of a battalion; two predominant allied armored forces (FRG and IDF) utilize wheeled versus tracked vehicles; and only Warsaw Pact forces employ a mixture of wheeled and tracked vehicles. Greater detail of these "international" scout units is provided in a stand-alone study not published as part of this report.

**Table 2. International View of the Scout Platoon**

	<u>LEVEL</u>	<u>SIZE</u>	<u>WHEEL</u>	<u>TRACK</u>	<u>MILMO</u>
UK	BN	PLT		X	
NL	BN	PLT		X	
BE	BN	PLT		X	
CAN	BN	PLT		X	
FRG	BN	PLT	X		X
IDF	BN	PLT	X		
FR	DIV	CO	X		
USMC	DIV	BN	X		
WP	RGT	CO	X	X	X

c. Comparative Baseline. The scout platoon, its equipment, and its operational concept have been the subject of a considerable number of tests, studies, and analyses. Table 3 lists those most pertinent to this CEP test and highlights three analyses which have significantly impacted on this effort. The Rand Study, published in October 1987 analyzed the current six-M3 CFV scout platoon encompassing 17 prior NTC rotations. It provided the most significant statistical performance and survivability baseline with which the two 10-vehicle platoons could be compared. A follow-on analysis, "Observations of Wheeled Scout Platoons", yet to be published, will assess five battalions which have employed the HMMWV in their scout platoons.

Table 3. Pertinent Tests, Studies, and Analyses

JAN 79	TEST OF MILITARY MOTORCYCLE (ARENBD)
DEC 86	FDTE OF BATTLEFIELD MGMT SYSTEM - 1 (ARENBD)
FEB 87	ASSESSMENT OF RECON & CR OPNS - NTC (USAARMS)
OCT 87	APPLYING THE NTC EXPERIENCE: TAC RECON (RAND/CATA)
JAN 88	JANUS MODELLING OF MOTORCYCLE IN BN SCOUT PLT
APR 88	NTC - TEN VEHICLE SCOUT PLATOON DEMO (USAARMS)
AUG 88	NTC ROTATION - 8 HMMWV SCOUT PLATOON (24TH ID(M))
AUG 88	CAVALRY/RECONNAISSANCE NET ASSESSMENT (USAARMS)
MAR 89	RECON/COUNTERRECON/SURVEILLANCE STUDY-PHASE 1 (CAC)
AUG 89	TEN HMMWV SCOUT PLATOON DEMONSTRATION (USAREUR/1AD)
AUG 89	SCOUT SENSOR STUDY (USAARMS)

Tables 4A and 4B summarize the findings and recommendations of these tests, studies, and analyses which provided a principal basis for the conduct of this CEP test and the configuration of the two 10-vehicle scout platoons. The two matrices demonstrate a high level of consistency in the findings and recommendations.

Table 4A.  
Deficiencies Documented in Pertinent  
Tests, Studies, and Analyses

DEFICIENCY	MILMO Test, Jan 79	BMS FDTE, Dec 86	Assess Recon & CR, Feb 87	Rand Study (NTC), Oct 87	JANUS Analysis-MILMO, Jan 88	Sct Plt Demo (NTC), Apr 88	Sct Plt Demo (NTC), Aug 88	Cav/Recon Net Assess, Aug 88	R/CRI/Surv Study, Mar 89	Ten HMMWV Plt Demo, Aug 89	Scout Sensor Study, Aug 89
M3 BRADLEY UNSATISFACTORY RECON VEH		X	X				X				
INSUFFICIENT QTY OF RECON VEHICLES		X		X	X	X	X	X		X	
RECON VEHICLES (M3) LACKS STEALTH		X				X	X	X		X	
INSUFFICIENT SENSORS (QTY/CAPABILITY)				X			X	X		X	X
EARLY/HIGH ATTRITION RATE		X	X			X					
SCOUT PLT HIGHLY SUSCEPTIBLE TO AIR THREAT				X			X			X	
INSUFFICIENT COMMUNICATIONS (CAPABILITY/RANGE)							X	X		X	

Table 4B.  
Recommendations of Pertinent  
Tests, Studies, and Analyses

RECOMMENDATIONS	MILMO Test, Jan 79	BRAS FDTI, Dec 88	Assess-Recon & CR, Feb 87	Recon Study (NTC), Oct 87	JANUS Analysis-MILMO, Jan 88	Scd Plt Demo (NTC), Apr 88	Scd Plt Demo (NTC), Aug 88	Cev/Recon Net Assess, Aug 88	R/C/R/Surv Study, Mar 89	Ten HMMWV Plt Demo, Aug 89	Scout Sensor Study, Aug 89
EMPLOY MILMO AS A RECON VEHICLE	X				X			X			
ADD "STEALTH" VEHICLE TO THE PLATOON						X	X	X		X	
ADD HMMWV TO THE SCOUT PLATOON							X	X		X	
INCREASE QUANTITY OF SCOUT VEHICLES					X	X	X	X		X	
INCREASE SENSORS (QUANTITY/CAPABILITY)		X		^			X	X		X	
PROVIDE AIR DEFENSE CAPABILITY				X			X			X	X
EXTEND COMMUNICATIONS CAPABILITY	X						X			X	

5. Test Issues and Results: The evaluation of each test issue is formatted as findings, results, and, if necessary, discussion. The results represent the recompilation and reduction of an extensive amount of collected raw data

a. Issue: Can the current and the two variations of the scout platoon perform the scout platoon mission?

(1) Findings.

(a) All three platoons are capable of performing the scout platoon mission.

(b) Both 10-vehicle variations of the scout platoon are more capable of performing the platoon's mission than the current platoon.

(c) The HMMWV platoon demonstrated a greater mission success rate than the Mixed platoon.

(2) Results. Mission capability was measured as a function of mission success as determined by the battalion commander, battalion S-3, and observer/controllers (O/C), the successful completion of mission tasks and subtasks as evaluated by the O/Cs, and specific responses from other key platoon and battalion personnel.

(a) The FEA documented the deficiencies of the current platoon. Cognizant of these deficiencies, the two 10-vehicle platoons were designed to alleviate, if not eliminate, these shortcomings. (NOTE: All historical data available on the M3 CFV platoon (base case) could not be equated to "mission success". Subsequently, comparisons with the M3 CFV base case are based purely on the subjective responses from key personnel.)

(b) Mission Success. Mission success was evaluated via two mediums: the outcome of exercises prior to and at the NTC, and the results of JANUS computer simulations. The spectrum of missions assigned to the two 10-vehicle scout platoons were MBR-T dependent as shown in Table 5 below.

Table 5. Missions Assigned

	<u>Mixed Platoon</u>		<u>HMMWV Platoon</u>	
	<u>Ft Stewart</u>	<u>NTC</u>	<u>Ft Stewart</u>	<u>NTC</u>
Zone Recon	X	X	X	X
Area Recon		X		
Route Recon			X	
Screen	X	X	X	X
Passage of Lines		X	X	

The measure of success was the fulfillment of the commander's intent. Tables 6A, 6B, and 6C summarize the subjective assessments of the battalion commanders, S-3s, and the O/Cs during the exercises at Fort Stewart and the NTC.

Table 6A. Mission Success (Fort Stewart)

	<u>Mixed Platoon</u>			<u>HMMWV Platoon</u>		
	<u>Success</u>	<u>Failure</u>	<u>Not Assessed</u>	<u>Success</u>	<u>Failure</u>	<u>Not Assessed</u>
CDR	1	2	1	4	0	0
S-3	2	0	2	4	0	0
O/C	2	2	0	3	1	0

Table 6B. Mission Success (NTC)

	<u>Mixed Platoon</u>			<u>HMMWV Platoon</u>		
	<u>Success</u>	<u>Failure</u>	<u>Not Assessed</u>	<u>Success</u>	<u>Failure</u>	<u>Not Assessed</u>
CDR	0	0	6	4	2	0
S-3	2	3	1	5	1	0
O/C	4	2	0	5	1	0

Table 6C. Mission Success (Overall)

	<u>Mixed Platoon</u>			<u>HMMWV Platoon</u>		
	<u>Success</u>	<u>Failure</u>	<u>Not Assessed</u>	<u>Success</u>	<u>Failure</u>	<u>Not Assessed</u>
CDR	1	2	7	8	2	0
S-3	4	3	3	9	1	0
O/C	6	4	0	8	2	0

Assessments of the HMMWV Platoon's success by the commander, S-3, and O/Cs were highly consistent at Fort Stewart and the NTC. Assessments of the Mixed Platoon lacked similar consistency. A trend was obvious that the HMMWV Platoon was assessed as having a greater mission success rate. This greater success rate cannot, however, be readily attributed to the vehicle mix due to dissimilar commander's intent, task organization, and level of training.

d. Key battalion and scout platoon personnel and O/Cs were asked to compare the capability of their 10-vehicle platoon with their previous six-vehicle platoon in the execution of principal scout platoon missions. The responses are summarized in Table 7. Of the 167 responses, 155 considered either 10-vehicle platoon to be more capable than the base case platoon.

**Table 7. Comparison of Mission Capability**

(Was the 10-Vehicle platoon more, equal, or less capable than the current 6-M3 CFV Platoon?)

Mission/Respondent	Mixed Platoon				HMMWV Platoon			
	More	Equal	Less	NR	More	Equal	Less	NR
<b>Movement Control</b>								
Bn Cdr/XO/S-3	3	0	0	0	3	0	0	0
Observer/Controller	7	0	4	2	2	0	0	1
Platoon Ldr/PSG	0	0	0	7	0	0	0	11
<b>Area Recon</b>								
Bn Cdr/XO/S-3	4	0	0	0	3	0	0	0
Observer/Controller	9	0	0	4	3	0	0	0
Platoon Ldr/PSG	3	0	4	0	10	0	1	0
<b>Route Recon</b>								
Bn Cdr/XO/S-3	4	0	0	0	3	0	0	0
Observer/Controller	13	0	2	0	3	0	0	0
Platoon Ldr/PSG	0	0	0	0	0	0	0	0
<b>Zone Recon</b>								
Bn Cdr/XO/S-3	4	0	0	0	3	0	0	0
Observer/Controller	11	0	0	2	2	0	0	1
Platoon Ldr/PSG	7	0	0	0	10	0	0	0
<b>Screen</b>								
Bn Cdr/XO/S-3	4	0	0	0	2	0	0	0
Observer/Controller	8	0	1	4	1	0	1	1
Platoon Ldr/PSG	6		1	0	11	0	0	0
<b>Total</b>	<b>87</b>	<b>0</b>	<b>10</b>	<b>17</b>	<b>68</b>	<b>0</b>	<b>2</b>	<b>14</b>

NR = No Response

The same key personnel, with the addition of the Scouts were asked to indicate what they considered to be the most significant attributes of their 10-vehicle platoon. Table 8 shows their response.

Table 8. Significant Attributes

Attribute	Mixed Platoon					HMMWV Platoon				
	Bn Staff	PL/ PSG	Scta	O/Cs	TOTAL	Bn Staff	PL/ PSG	Scta	O/Cs	TOTAL
Strength	2	0	0	0	2	8	0	0	0	8
Flexibility	4	8	0	4	14	2	4	0	3	18
Area Coverage	5	7	0	12	24	5	10	0	2	17
Depth	4	5	0	11	20	4	11	0	3	20
Maneuverability	0	0	33	0	33	6	0	31	0	36
Mobility	0	0	0	0	0	3	0	0	0	6
Multiple Mins	3	8	0	12	21	3	11	0	3	21
Sustainability/CONOPS	0	10	33	17	60	1	17	29	2	39

Both 10-vehicle platoons were considered to have a marked increase in capability and to have alleviated many of the current platoon's documented deficiencies. The predominant attributes were related to the quantity of vehicles rather than the type.

(c) Mission Task/Subtask Performance. The performance of specific tasks as detailed in ARTEP 17-57-10 MTP, "Scout Platoon", were evaluated by O/Cs. The MTP provides 28 mission tasks consisting of 219 subtasks. Figure 1 indicates the overall performance of the Mixed and HMMWV Platoons at Fort Stewart, at the NTC, and overall. No weighted values were assumed for any task or subtask. The HMMWV Platoon demonstrated a greater "GO" performance during each phase of the evaluation. Also noted was a significant increase in "NO-GOs" by the Mixed Platoon during the NTC phase. The differences in performance between platoons could not be isolated to any specific or grouping of tasks. Five mission tasks somewhat unique to a Scout platoon's mission essential task list were selected for further comparison: zone, route, and area reconnaissance, screen, and passage of lines. The HMMWV Platoon again compared favorably for each task as indicated by Figure 2. Figure 3 compares the performance of all 28 tasks and in every instance the HMMWV Platoon compared favorably.

Figure 1. Mission Task GO/NO-GO Performance

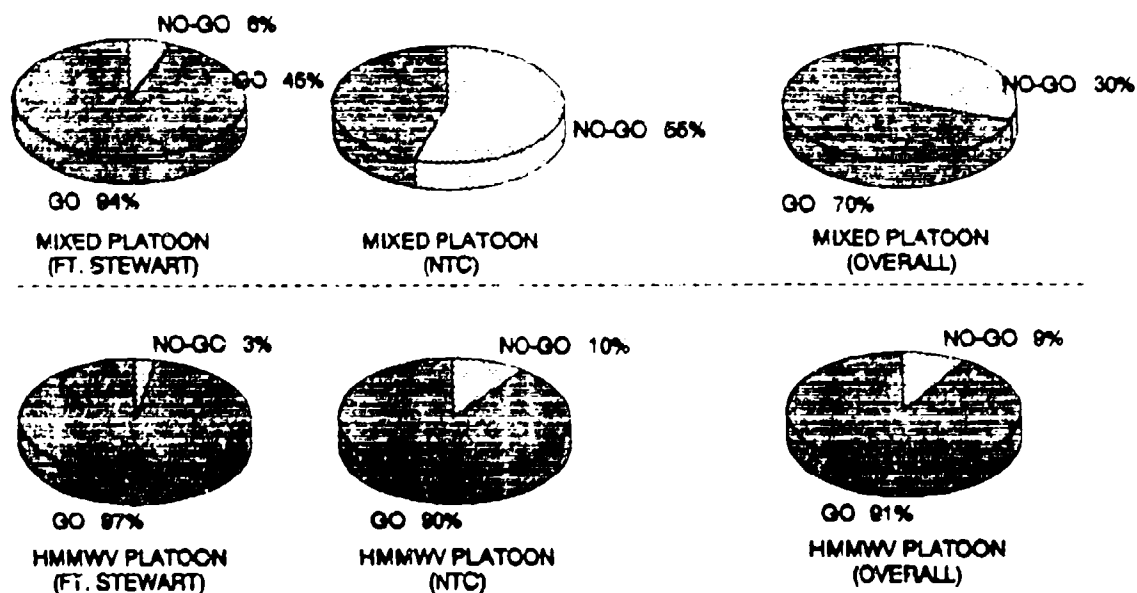


Figure 2. Selected Mission Task Performance  
(Mixed and HMMWV Platoons)

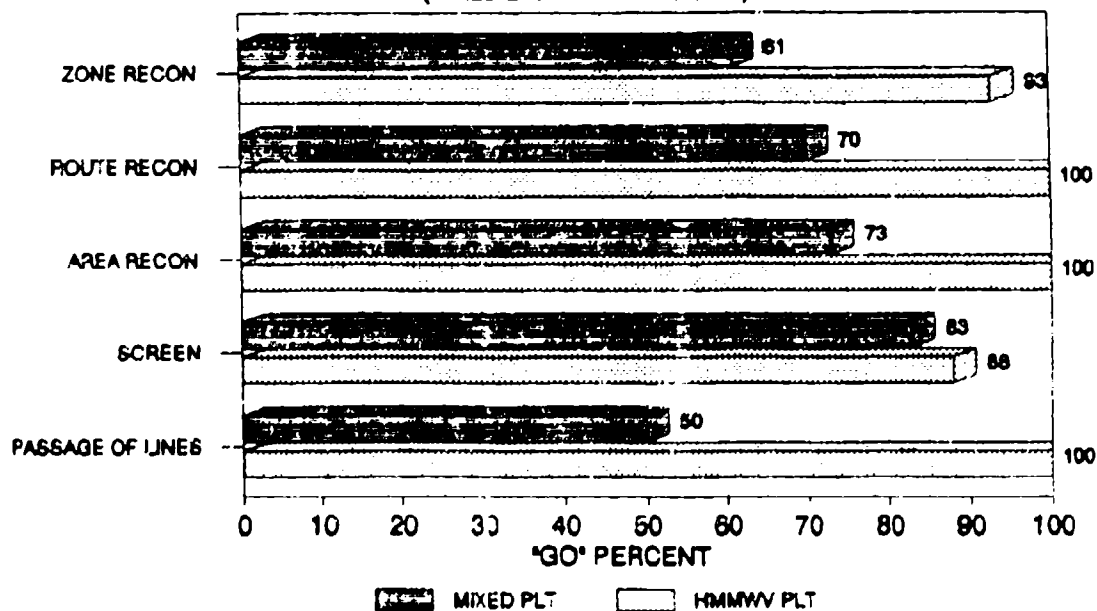
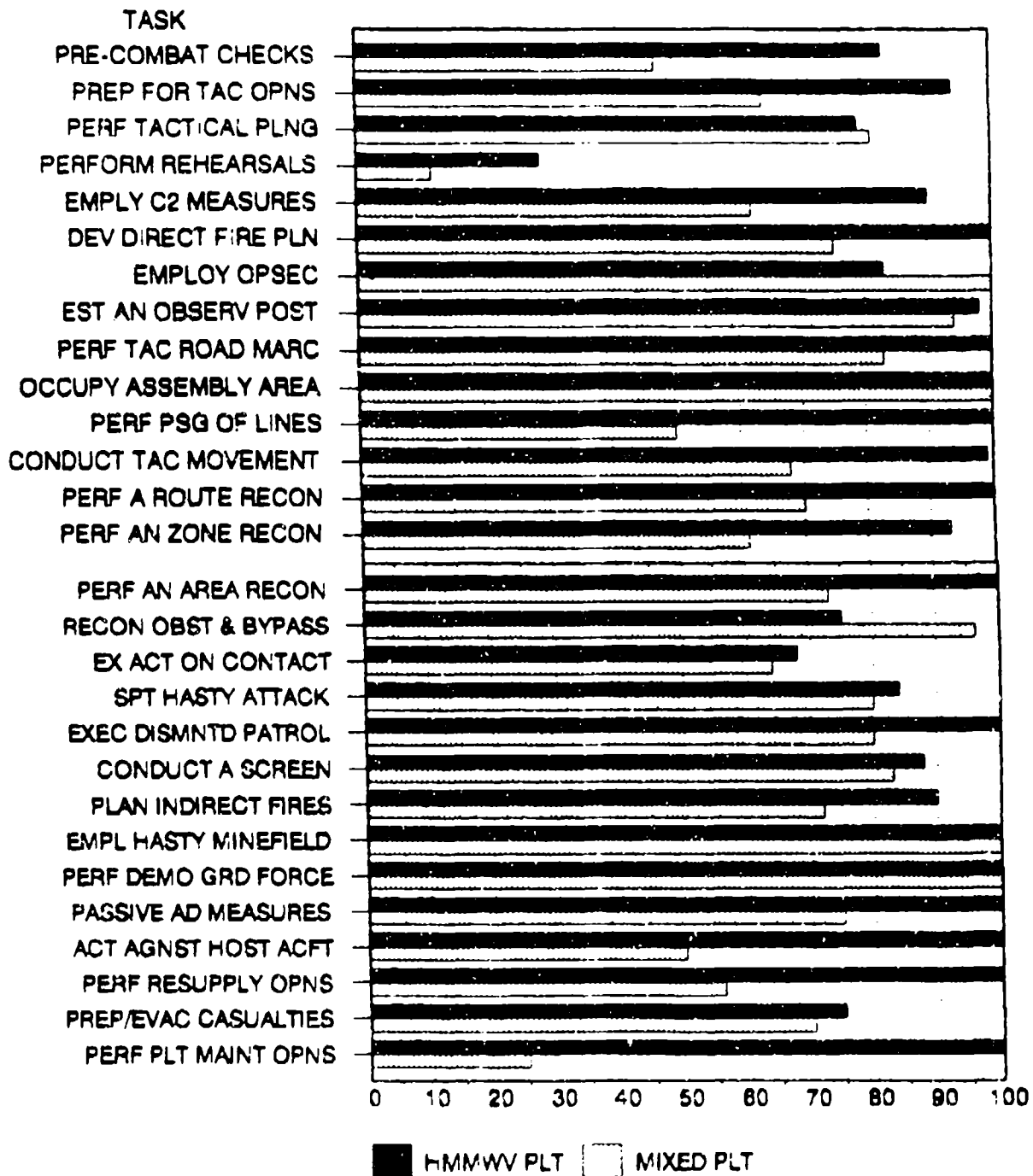




Figure 3. "GO" PERFORMANCE OF MISSION TASKS

(MIXED & HMMWV PLATOONS)

(Fort Stewart and LTC)



(d) It must be noted that the Mixed Platoon was initially task organized with antitank elements to enhance its counterreconnaissance capability. Prior to the completion of training at Fort Stewart, the leadership refocused the employment concept. This may account for the platoon's less comparable performance. Consequently, no decisive conclusions can be made which attribute platoon performance to a specific type vehicle mix based on mission task performance.

(e) JANUS Analysis. Using the JANUS Simulation Model, the current and two variations of the scout platoon were wargamed with ten iterations per variation using High Resolution Scenario #2, Blue Task Force Attack. Appendix C details the gaming results. The Essential Elements of Analysis related to mission capability was the capability of each Scout Platoon to: (1) locate second echelon threat positions; and (2) provide early warning of a threat counterattack. Table 9 summarizes the gaming results.

**Table 9. JANUS Analysis of Mission Capability**

	<u>M3 CFV Platoon</u>	<u>Mixed Platoon</u>	<u>HMMWV Platoon</u>
<b>Avg No. 2nd Echelon Detections</b>	3.2	4.0	11.0
<b>No. Times Threat Counter-Attack Force Located</b>	2	2	5

The HMMWV Platoon compared favorably in both performance elements. The current M3 CFV platoon was often destroyed prior to reaching the desired observation sites. The Mixed platoon was also attrited in large numbers but achieved its observation position more often than the M3 platoon. This small increase was not statistically significant. The HMMWV platoon was found to be the most survivable and most successful in providing the TF commander with information on second echelon threat activity. Generally, both 10-vehicle platoons were able to absorb losses yet retain operational capabilities and one or two HMMWV's and/or MILMOs were normally able to get deep into the enemy's rear.

(3) Discussion: In summary of the mission capability issue, there were differences in level of training between the platoons which limited the ability to draw clear differences which could be attributed simply to the vehicle mix. The opinion of many members of the NTC Operations Group was that the wheeled reconnaissance elements penetrated better and had more influence on the outcome of the battle. Also, the wheeled platoons were destroyed later in the scenarios, thus had the opportunity to make greater contributions. The results of JANUS gaming were consistent with these observations.

b. Issue: Does the operational employment of the two variations of the scout platoon require unique tactics, techniques, and procedures (TTP)?

(1) Finding: Current doctrine is sound and readily applies to both 10-vehicle scout platoon configurations. Some unique TTPs are dictated by the increased number of vehicles, to include the four motorcycles, which are not currently addressed in the scout platoon manuals.

(2) Results: Scout formations such as: the coil, herringbone, column, staggered column, and section organizations must be modified to include the additional four vehicles and four motorcycles. The techniques of movement, procedures for establishing an assembly area, performing a screen, conducting zone, route, and area reconnaissance remain unchanged. The larger platoon permits the platoon to occupy a greater number of observation posts, conduct more patrols and reconnoiter multiple routes/axes.

(3) Discussion:

(a) The Command and Staff Department, USAARMS, conducted a thorough assessment of current TTPs. Subject matter experts (SME) determined that the 10-vehicle configuration afforded greater flexibility in formation/movement, mission area coverage, and variety of section organizations, depending on METT-T. Capabilities unique to the mixes of optics, communications, vehicles, and weapons were accounted for in developing TTPs unique to each configuration. The HMMWV platoon may be employed in a 2, 3, 4 or 5 section organization. The Mixed platoon has the same capability, plus it may be organized in a heavy/light or light/heavy configuration. Both 10-vehicle platoons increase the platoon's frontage capability from 3-5 km to 8-12 kms. The platoons can man up to five observation posts (OP) for an extended period of time and 10 OPs for short periods. The unique TTPs resulted in a training support package which supported platoon train-up and employment. This package, published separately, will facilitate the future publication of revised TTPs.

c. Issue. Are the platoons survivable?

(1) Findings:

(a) Both 10-vehicle platoons demonstrated an increased level of survivability over the current 6-CFV platoon.

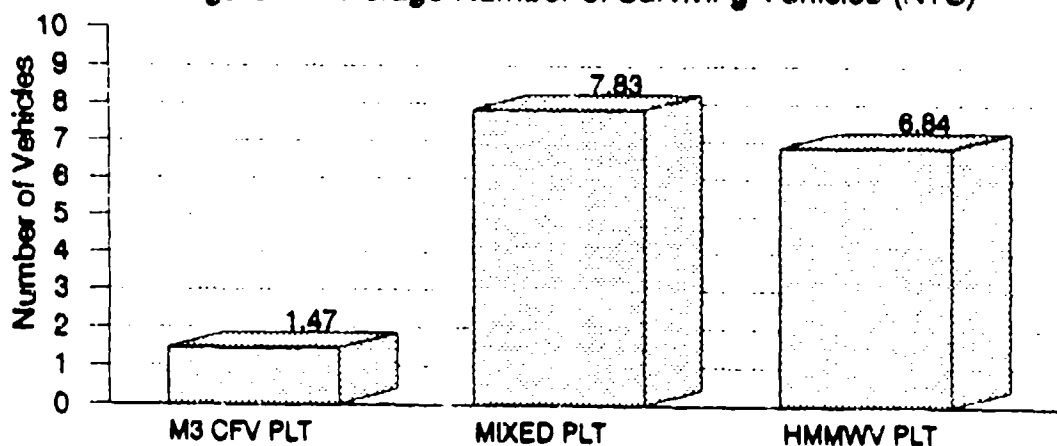
(b) The Mixed platoon demonstrated greater overall survivability than the HMMWV platoon at the NTC and equal survivability during the JANUS analysis.

(c) Significant caveats to the results preclude conclusive comparisons of survival data.

(2) Results: Appendix D provides a detailed accounting of the losses and the cause experienced by each alternative platoon during the NTC rotation and the JANUS analysis. Extensive historical data on the base case platoon was available for comparison.

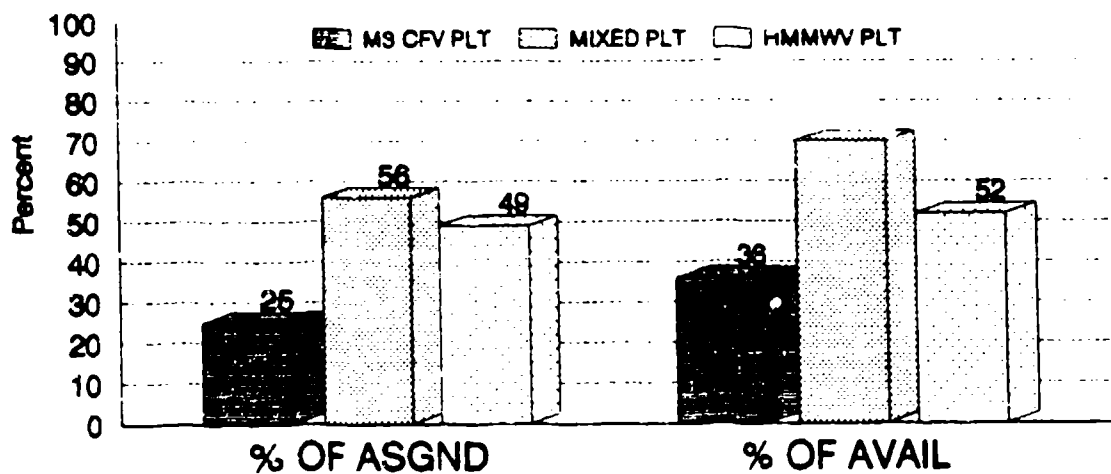
(a) "Survivability" is a very complex issue, subsequently a variety of perspectives were used to compare the three alternative platoons. The most simple perspective was the average number of vehicles surviving at the end of each mission, as indicated by Figure 4. Both 10-vehicle platoons averaged significantly more vehicles than the base case platoon and the Mixed Platoon averaged one more vehicle than the HMMWV Platoon. These averages are deceptive, however, because they fail to account for the impact of the number of vehicles initially assigned, type of vehicle mix, and those vehicles which survived because they never departed from the motor pool.

Figure 4. Average Number of Surviving Vehicles (NTC)



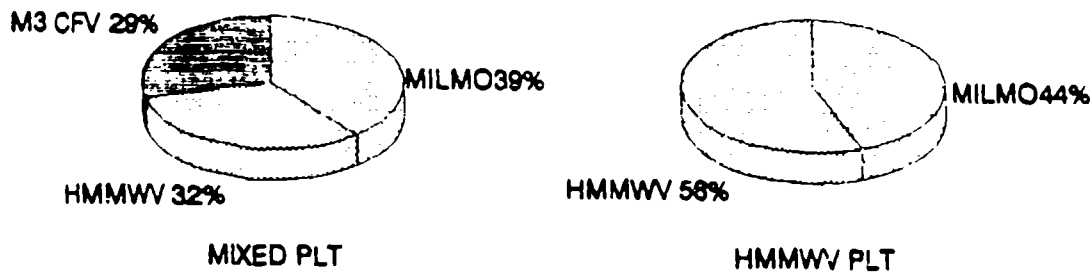
(b) Figure 5 portrays the relative survivability of each platoon as a percentage of number of vehicles assigned and the average number of vehicles operationally available. Again, both 10-vehicle platoons averaged significantly more surviving vehicles than the base case platoon and the Mixed Platoon retained its advantage over the HMMWV Platoon.

Figure 5. Average Number of Surviving Vehicles  
(NTC)



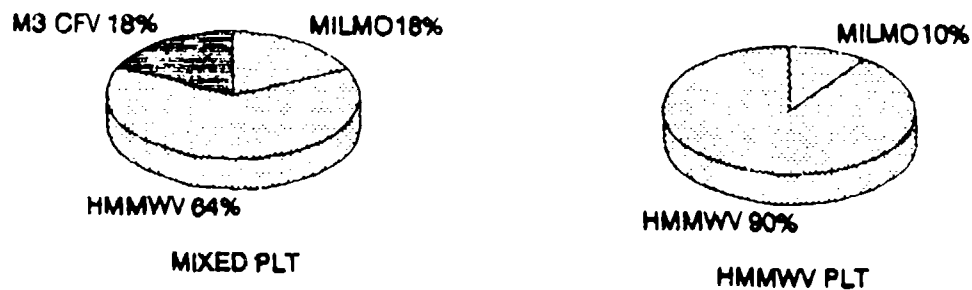
(c) Further analysis provided insights as to the attributes of the Mixed Platoon which resulted in its greater survival rate. The vulnerability of the HMMWV and MILMO vice the M3 CF as a scout vehicle was a concern to be resolved. Figure 6 reflects which type vehicle contributed to the overall survivability of each platoon. The M3 CFV was the least contributor to the Mixed Platoon's overall vehicle survivability.

**Figure 6. Type-Vehicle Survival  
vs  
Total Vehicle Survival**



(d) Conversely, Figure 7 demonstrates which type vehicles accounted for each platoon's average losses. The HMMWV accounted for the majority of losses in both 10-vehicle platoons while the MILMO and M3 CFV experienced low loss rates.

**Figure 7. Type Vehicle Losses  
vs  
Total Vehicle Survival**



(e) A variety of causes accounted for the losses of each platoon and provided additional insights on their survivability. The distribution of cause for each platoon is compared by Figures 8 and 9.

Figure 8. Platoon Losses by Cause

(OTHER = AIR, CHEM, MINES)

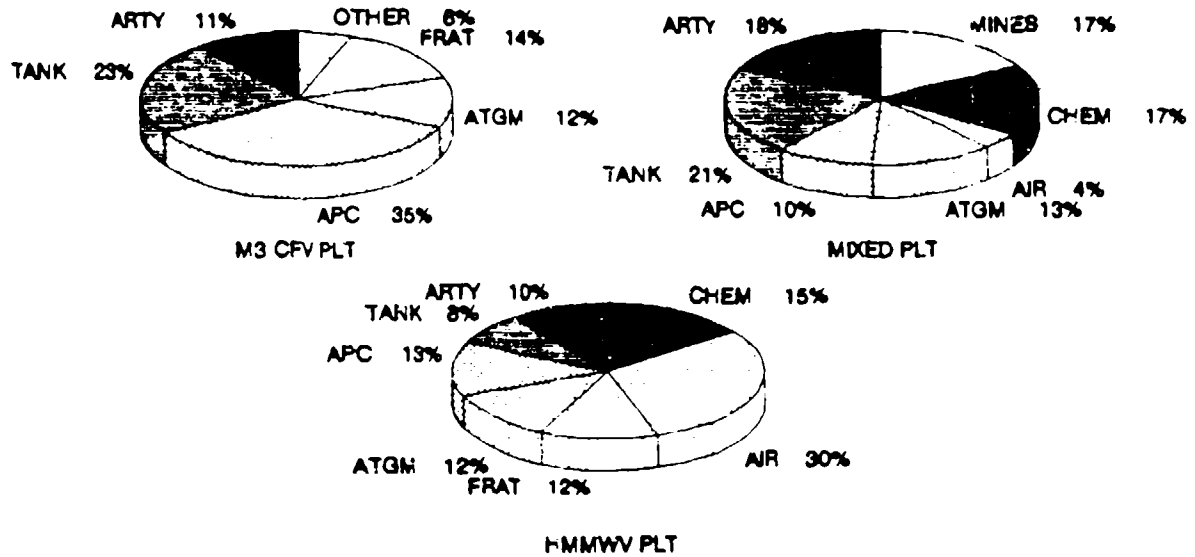
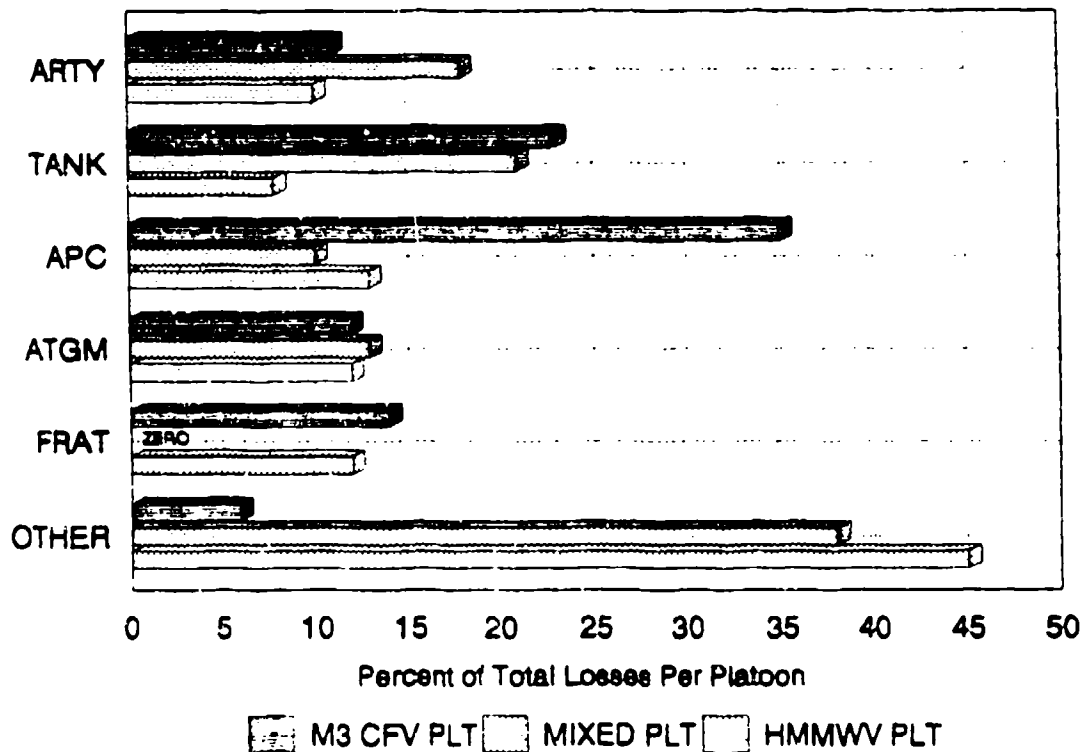
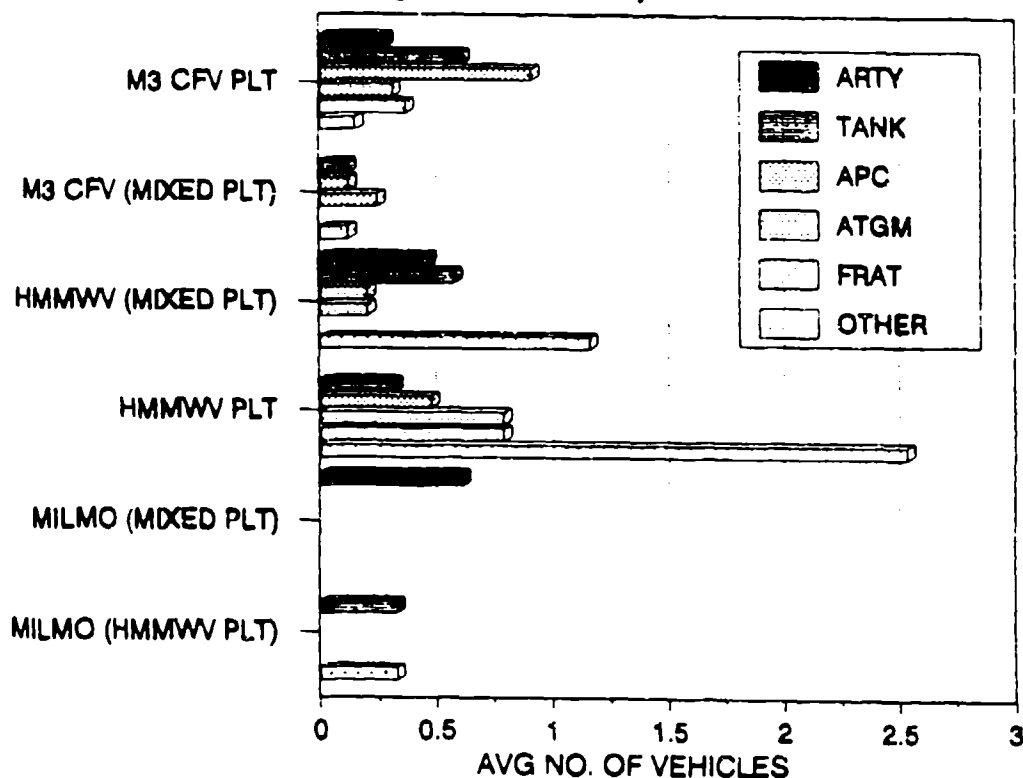


Figure 9. Comparison of Platoon Losses by Cause



Historically, the M3 CFVs in the scout platoon average a 73% attrition rate primarily attributed to engagements with tanks and APCs (BMP/BRDM). The Mixed Platoon's M3 CFV attrition rate was reduced by two-thirds (down to 21%). the platoon experienced a significant reduction in losses to APCs and fratricide. A possible explanation was provided by the O/Cs in that the M3s were typically employed in Overwatch of the HMMWVs resulting in a greater attrition of HMMWVs to tanks and APCs. Figure 10, which compares the losses of a specific type vehicle employed in the alternative platoons, supports this explanation.

Figure 10. Average Vehicle Losses by Cause



Contrary to some expectations, HMMWV losses to artillery were not significant relative to other major causes. The HMMWV Platoon lost double the number of vehicles to enemy aircraft than any other cause. Conversely, the Mixed Platoon's losses to enemy aircraft was the least cause. Both platoons employed the Stinger missile during the Fort Stewart and NTC phases and accounted for six successful engagements against attacking aircraft (three fixed wing and three helicopters). An apparent reliability problem with the Stinger/MILES system precluded its employment on numerous



occasions resulting in considerable losses to aircraft conducting reconnaissance and counterreconnaissance operations.

The MILMO was the most survivable vehicle in both 10-vehicle platoons. While the MILMO losses in the HMMWV Platoon were attributable to tanks, enemy aircraft, and chemical, all MILMO losses of the Mixed Platoon were solely caused by artillery.

(3) Discussion:

(a) At the NTC the Mixed Platoon experienced a 79% survival rate for its four M3 CFVs. This is more than twice that experienced by the M3 CFV scout platoons averaged over 17 previous rotations. This can be accounted for in that the M3 CFVs of the Mixed platoon typically provided overwatch for the HMMWVs and MILMOs which became extensively attrited. Forty-eight total HMMWV losses were experienced at NTC by both platoons. In every instance, the weapon system causing the loss would have also defeated the M3 CFV.

(b) The NTC OPFOR considered the stealth of the HMMWV a significant attribute and were similarly impressed with the motorcycle's mobility and stealth. They found the motorcycle difficult to acquire and subsequently destroy. This was attributed to its stealth, small silhouette, and minimal thermal signature. The overall survivability rate of the MILMO exceeded that of all other vehicles.

(c) The NTC Observer/Controllers found that while the wheeled scouts suffered casualty rates similar to conventionally configured platoons, they were being destroyed later in the scenario, after having had a greater influence on the outcome of the battle. Nonetheless, the O/Cs felt that:

(1) The high casualty rate merits attention from trainers, doctrine writers, and equipment developers.

(2) Although the lack of heavy armament does not seem to be a significant drawback to survivability of the scouts, a self-defense anti-armor weapon is needed for protection against marauding OPFOR security elements and unavoidable engagements.

d. Issue: Is the organizational design correct for the two variations of the scout platoon?

(1) Findings:

(a) The two 10 vehicle platoons, as designed, were correct for the performance of the scout platoon's mission. (The

test Tables of Organization and Equipment for each alternative platoon is provided as Appendix E).

(b) The organization structure, manpower, and equipment density of both 10-vehicle platoons satisfied mission requirements.

(c) The structure was consistent with command and control requirements and remained within the platoon leader's span-of-control.

(d) The many attributes of the 10-vehicle platoons eliminated some documented deficiencies of the current platoon; many other deficiencies were alleviated. Shortcomings associated with specific items of equipment are addressed further on in this report.

(e) The 10-vehicle scout platoons compare favorably in fielding costs over the current platoon.

(2) Results: Key battalion and all scout personnel were asked to indicate what changes they desired for their specific scout platoon. No responses indicated significant changes were needed. The few applicable responses are discussed below (NOTE: Responses which focused on the deficiencies and efficiencies of specific items of equipment are addressed in a subsequent test issue.)

(a) Personnel. The Fire Support Officers of both battalion task forces did not think the use of forward observers with the scout platoon to be of any significant advantage, and, given the opportunity would have employed them elsewhere. The majority of respondents from the Mixed Platoon indicated the need for an additional scout on each M3 CFV. Fifty percent of HMMWV Platoon respondents indicated the desire for an additional scout per HMMWV, primarily for when the MILMO was employed.

(b) Equipment. All HMMWV Platoon respondents and HMMWV mounted scouts of the Mixed Platoon indicated a need for a lightweight, defensive antitank capability.

### (3) Discussion:

(a) The Mixed Platoon, with its 4-CFV/6-HMMWV mix, was designed requiring 34 personnel. A constraint to the current authorized manning level of 30 personnel would require a reduction of one CFV.

(b) The scout platoons were typically augmented with engineers, a medic, and artillery forward observers (FO) equipped with a digital message device. Considerable response from test players and O/Cs at NTC felt this augmentation should be established as being organic to the platoon's design. The engineers aided in terrain analysis and provided expertise relative to obstacle analyses. A medic is needed to respond to the casualties of the scout platoon operating well forward of the task force. The FOs added an excellent capability to coordinate fires and in one instance directed artillery which destroyed 53% of the OPFOR vehicles during a deliberate night attack. Early attrition of the threat using directed artillery significantly preserved the task force's combat power.

(c) The unit fielding costs of each platoon are shown in Table 10. Costs assume no sunk costs and personnel costs are relative to pay grade over a one-year period.

Table 10. Unit Fielding Cost

	<u>M3 CFV</u>	<u>Mixed Platoon</u>	<u>HMMWV Platoon</u>
Personnel	\$368K	\$422K	\$365K
Equipment	\$9403k	\$7668k	\$2540k
ASL (30 Days)	\$17K	\$12K	\$1K
	<hr/>	<hr/>	<hr/>
Total	\$9788K	\$8102K	\$2906K

e. Issue: Does the TOE allocated equipment satisfy mission requirements?

(1) Findings:

(a) Vehicles. The HMMWV and MILMO satisfied scout mission requirements.

(b) Optics. The driver's thermal viewer (DTV), installed on the M3 CFV specifically for this test, significantly increased the system's operational effectiveness during periods of reduced visibility. The mix of optical systems satisfied mission requirements. Some shortcomings were noted on specific items of optical equipment.

(c) Weapons. The designed mix of weapon systems satisfied principal mission requirements. The Stinger missile, employed in a self-defense role, contributed significantly to survivability. The lack of a self-defense anti-armor capability precluded effective engagement of unavoidable threats.

(d) Communications. With some exceptions, the communications systems satisfied mission requirements.

## (2) Results.

(a) Vehicles. The BMWV afforded the mobility, maneuverability, and reliability necessary to support the scout mission. Users recommended the installation of an underbelly skid plate. The prototype MILMO racks were considered too heavy and the MILMO securing setup lacked reliability and ease of operation. Due to the MILMO's inherent stealth, mobility, and maneuverability, it extended the platoon's survivability and increased the capability to conduct reconnaissance and security missions.

### (b) Optics.

1. The DTV on the CFV afforded a dramatic increase in driver proficiency at night and increased the pace of operations during limited visibility. The sight resolution was considered excellent. Drivers frequently acquired targets prior to the vehicle commander using weapon optical systems.

2. The AN/PAS-7 Thermal Sight demonstrated poor range and picture distortion at Fort Stewart, therefore was not taken to NTC.

3. The AN/TAS-4A TOW Thermal Sight was rated favorable to the AN/TAS-6 because of no requirement for coolant bottles.

4. Users preferred the AN/PVS-7B Night Vision Goggles vice AN/PVS-5 due to weight.

5. The AN/GVS-5 Laser Range Finder satisfied requirements and proved compatible with the AN/TAS-6 Night Vision Sight. It was not operationally employed as it is not eyesafe.

6. The commercial 14x Stabilized Binoculars were highly unreliable, but were rated outstanding when functioning. The current inventory M22 Binoculars proved rugged and performed well. The M-22's lenses should be non-reflective coated.

7. The AN/PAQ-1 Hand Held Laser Target Designator was unused due to not being eyesafe. Its range of 800 meters was considered inadequate.

(c) Weapons.

1. The Stinger missile afforded a self-defense capability typically unavailable to the scout platoon. As configured, the HMMWV did not have adequate stowage racks for the Stinger.

2. Users considered the M-4 carbine ideal for MILMO riders and highly recommended it for all scouts due to its compactness.

(d) Communications. Communications were usually rated as adequate. Specific system results were:

1. The Global Positioning System was unavailable for use at Fort Stewart and was seldom used at the NTC because the time window of the immature satellite system was not simultaneous to mission periods. When used it proved accurate and effective for orientation during periods of limited visibility and in areas of indistinguishable terrain. Users recommended installation on all scout vehicles.

2. The AN/PRC-126 Small Unit Radio effectively supported intra-platoon communications in forward areas, especially applicable for observation posts and motorcycle mounted scouts. It demonstrated a reliable range up to three kilometers.

3. Extendable Antennae. The AB/903G Crank Antennae was unused due to bulkiness and mounting problems. The commercial extendable mast antenna increased the normal range, but did not fully satisfy operational requirements.

4. The AN/PSC-2 Digital Message Device was assessed during pre-NTC exercises to be too noisy and not user friendly, and therefore not taken to NTC.

(3) Discussion: Appendix F lists specific equipment issues and corrective actions.

(a) The MILMO added a new dimension to the scout platoons. It supported an increased tempo of reconnaissance by covering dead space and clearing terrain prior to the exposure of other platoon vehicles. Additionally, MILMOs facilitated tactical road marches by operating forward and on the flanks of the platoon to provide early warning. MILMOs should be employed in sections

and always maintain radio communications with the platoon. During reconnaissance missions, a MILMO section can operate 3-5kms forward of other vehicles. During screening missions, they may operate independently, maintain contact between adjacent units/OPs, or provide surveillance of dead space and suspicious looking areas. During night operations the MILMO was less effective because the NVGs could not be securely fastened to the current MILMO helmet. The MILMO section must be able to operate independently of the platoon with the rider technically and tactically proficient in several skill level 2 and 3 tasks. The MILMO Helmet requires better interface with communications and night vision equipment. The rider requires shin guards, chest/shoulder protection, boots; the kevlar vest was considered too hot, heavy, and bulky. Weapons scabbard, saddle bags are needed.

(b) Communications. The issue of reliable comms was not settled. The matter of long range comms to the rear requires further attention. One platoon used AT-984/G Antennae on MILMOs and extended its range to 5 kms. It was considered essential that all radios, including the AN/PRC-126, have secure capabilities.

f. Issue: What is the transportability of the scout platoons?

(1) Finding: The scout platoon is capable of self-transporting its authorized equipment and basic load with its organic vehicles.

(2) Results: HMMWV load plans, Appendix G, were developed, refined, and executed. The only shortcoming noted was that the stowage of Stinger missiles was inadequate.

(3) Discussion: The load plans were refined during the train-up and pre-NTC period. Future load plans will require modification relative to the type of HMMWV authorized and ultimate equipment changes.

g. Issue: How do the two 10-vehicle variations of the scout platoons affect deployability at the battalion and division level?

(1) Finding: Neither of the two variations significantly affect the deployability of either the armor or mechanized infantry battalions.

(2) Results: The only effect of varying the platoon configurations is that the HMMWV platoon reduces the air sortie requirements for the mechanized infantry by one, from 47 to 46

C-5A aircraft sorties. Table 11 below summarizes the air-deployability impact.

Table 11. Air-Deployability (C-5A Sorties)

	<u>M3 CFV</u>	<u>Mixed Platoon</u>	<u>HMMWV Platoon</u>
Mech Bn	47	47	46
Armor Bn	65	65	65

(3) Discussion: A computerized simulation using the Army Air-Load Planning System (AALPS) supported the comparison of each of the three platoons in each of the heavy battalions based on full-up TOE requirements. The tracked combat vehicles drove the C-5A aircraft requirement and all other equipment served as "fillers" to those aircraft.

h. Issue: Are the two variations of the scout platoon logistically supportable?

(1) Finding:

(a) The HMMWV and Mixed platoons are logistically supportable with the existing support structure and logistics support equipment.

(b) The HMMWV Platoon reduces overall support personnel requirements.

(c) The Mixed Platoon does not increase or decrease support personnel requirements but does impact on MOS requirements.

(2) Results:

(a) Manpower. The specific impacts on quantity and MOS structure, as determined IAW AR 570-2, are shown in Table 12.

Table 12. CSS Personnel Impact

	<u>Mixed Platoon</u>		<u>HMMWV Platoon</u>	
	<u>Mech Bn</u>	<u>Armor Bn</u>	<u>Mech Bn</u>	<u>Armor Bn</u>
63T Track Mech	-1	-1	-3	-3
63B Wld Mech	+1	+1	+1	+1
45T Turret Mech	0	0	0	-1
77F POL HEMTT Drvr	0	0	-1	-1
Net Impact	0	0	-3	-4

(b) Equipment. The impact on equipment, driven by changes in the quantity and type of resupply, maintenance, and Class IX mobility, was not adequately assessed during this CEP to provide specific impacts. Class V cube and weight changes appear not to impact on cargo haul requirements. Class III changes in diesel vice mogas and vehicle consumption rates require further analysis.

(c) Vehicle Operational Availability Rates (Ao). The comparative Ao of each platoon and type vehicle are shown in Table 13.

Table 13. Average Vehicle Operational Availability Rate (Ao) at NTC

	<u>M3 CFV PLATOON</u>	<u>MIXED PLATOON</u>				<u>HMMWV PLATOON</u>		
	CFV	CFV	HMMWV	MILMO	TOTAL	HMMWV	MILMO	TOTAL
Veh On Hand	6	4	6	4	14	10	4	14
Veh Available	4.1	2.8	4.7	3.7	11.2	9.5	3.7	13.2
Ao	68%	71%	78%	92%	80%	95%	92%	94%

(1) The 10-vehicle platoons demonstrated a higher overall Ao than the base case.

(2) The HMMWV Platoon demonstrated a slightly higher Ao than the Mixed Platoon.



(3) The HMMWVs of the HMMWV Platoon experienced a higher Ao than the HMMWVs of the Mixed Platoon.

(4) The MILMO demonstrated an overall Ao greater than the HMMWV and M3 CFV (MILMO = 91.8%, HMMWV = 88.6%, M3 CFV = 89.3%).

(d) Supplies. Table 14 predicts the gross consumption of Class III and V relative to two days of combat. These consumption rates are supportable by the existing battalion structures. Prescribed Load Lists were not significantly modified for this CEP to support the changes in the type and quantity of vehicles, weapons, optics, and communications. PLL modifications would be required relative to any ultimate changes. Scout Platoon personnel were surveyed to provide an insight of what MILMO repair parts and supplies should be readily available based on their experience of need during the Fort Stewart and NTC phases. Appendix H summarizes their responses and provides an indicator of the MILMO PLL requirement.

Table 14. Supply Consumption (2 Days Combat.)

	<u>M3 CFV Platoon</u>	<u>Mixed Platoon</u>	<u>HMMWV Platoon</u>
Class III (Gals Diesel/Mogas)	900/48	639/48	66/48
Class V (Tons)	4.3	3.4	1.7

(3) Discussion.

(a) At NTC the HMMWV platoon fired three Stingers and used the MK19 on one mission. The poor reliability of the Stinger MILES precluded its further use on many attempts. The Mixed platoon fired 3700 rounds of 25mm in four offensive missions and 100 rounds of MK19 in three missions.

(b) CSS was rated entirely adequate for the HMMWV platoon, and got mixed reviews in the Mixed platoon; however, in every case it was noted that CSS was accomplished forward. Prior rotations have indicated that this process is much easier for the truck-mounted scouts.

(c) The NTC O/Cs, recommended a dedicated CSS vehicle for LOGPAC as the scout's abilities are enhanced by having resupply flexibility.

(d) The battalion executive, maintenance, and supply officers responded to questionnaires administered after each major event of the CEP. A summary of the responses is provided as Appendix I.

i. Issue: What increased or decreased training requirements are unique to the two variations of the platoon?

(1) Findings:

(a) The 10-vehicle scout platoons do not significantly increase or decrease collective training from that required of the current 6-vehicle platoon.

(b) The increase in types of equipment associated with both 10-vehicle platoons requires more initial and sustainment training for the individual soldier.

(c) Training resource requirements varied considerably between platoon variations. The maintenance demand and operating and support costs associated with the type and quantity of vehicle platforms impact on the ability to conduct training. The increased availability rate of the HMMWV, vice the M3 CFV, increases the availability of equipment for training. The decreased maintenance manhours increases available training time. Based on analysis of Operating Tempo (OPTEMPO) and Standards in Training Commission (STRAC) allocations/requirements per training year for a Category 1 organization, the platoon training costs are shown below:

Table 15. Annual Unit Training Cost (OPTEMPO/STRAC)\*

	<u>M3 CFV Platoon</u>	<u>Mixed Platoon</u>	<u>HMMWV Platoon</u>
Class III	\$3.3K	\$3.3K	\$1.6K
Class V	\$190.0K	\$157.0K	\$57.0K
Class IV	\$91.0K	\$70.9K	\$16.0K
Total	\$284.3K	\$230.2K	\$74.6K

\* does not incl MILMO

(d) Generally, changes are required in scout individual and collective training content as indicated below:

Table 16. General Training Impacts

- o 10 Vehicle Platoon:
  - Increases Emphasis on Command and Control
  - Increases Emphasis on Equipment Training
- o MILMO:
  - Tactical Employment Training
  - Qualification Training
- o Gunnery:
  - Refocuses with HMMWV Platoon
  - Required Training Time May be Reduced
  - Added Requirements with Mixed Platoon
- o Maintenance:
  - Maintenance Time May be Reduced
  - Vehicle Availability for Training May Increase

(2) Results:

(a) The Mixed Platoon demonstrated training resource requirements equitable to that of the current platoon. The HMMWV platoon significantly reduces training resource requirements.

(b) A review of USAARMS' resident training courses was conducted to determine which would be impacted relative to program of instruction (POI), equipment requirements, training costs/schedule, and publications. Table 16 summarizes this review. The extent of these impacts is beyond the scope of this evaluation.

Table 17. Impact on Institutional Training Courses

COURSE	POI	EQUIP	COST/ SCHED	PUBS
180 O&UT	YES	YES	YES	YES
AOB	YES	YES	YES	YES
S LC	YES	YES	YES	YES
BACOC	YES	YES		YES
ANCOC	YES	YES	YES	YES
ACAC	YES			YES
PCC	YES			YES
BCCC			YES	

(3) Discussion:

(a) The increase in reconnaissance platforms requires increased leadership training relative to exercising span-of-control.

(b) Both 10-vehicle platoons were configured with a greater variety in optics, communications, weapons and vehicles. This increased initial and sustainment training for the individual soldier.

j. Issue: Are there any safety considerations and/or soldier interface problems unique to the two variations of the platoon?

(1) Findings: The motorcycle presents a number of safety considerations:

(a) Motorcycles should be operated in either pairs or with another vehicle.

(b) Maximum utilization of operator protective equipment is essential.

(c) The man-machine-system interface, to include communications, optics, weapons, and clothing equipment, directly effects the operational effectiveness and operational safety.

(2) Results: No safety concerns were presented which were not alleviated through either supervision, training, or equipment fixes. No instances of significant injury incidents occurred during this test.

(3) Discussion: Motorcycle safety was a prime concern throughout the execution of the CEP. Pairing of motorcycles or with other vehicles is not only operationally sound, but enhances safety awareness and provides "buddy" support should an incident occur. Specific equipment fixes needed are:

(a) Identification and availability of protective equipment to include shin guards, boots, gloves, and face and body shields.

(b) Interface of rider/helmet/motorcycle with communications equipment.

(c) Helmet interface night vision goggles.

## 7. Conclusions:

### a. Operational effectiveness.

(1) Both 10-vehicle platoons are more capable of performing the scout platoon mission.

(2) The differences in the two 10-vehicle platoons' performance could not be conclusively attributable to vehicle mix.

(3) The results of mission performance lack the necessary level of confidence to be wholly attributable to vehicle mix.

(4) The HMMWV platoon demonstrated greater operational effectiveness in terms of mission success and specific task performance than the Mixed Platoon. However, this cannot be clearly attributed to the vehicle mix. Although the HMMWV platoon also experienced greater mission success in JANUS modeling, the limitations of the model preclude decisive comparisons. Therefore it could not be concluded whether the HMMWV or the Mixed platoon affords greater operational effectiveness.

### b. Doctrine/TTP.

(1) Current doctrine is sound and requires no modification to accommodate the employment of a 10-vehicle scout platoon.

(2) Revised TTPs are necessary for the employment of a 10-vehicle platoon. Some TTPs are unique to a HMMWV or Mixed platoon.

### c. Survivability.

(1) No degradation in survivability is associated with either 10-vehicle platoon.

(2) The Mixed Platoon demonstrated overall higher survivability than the HMMWV Platoon attributable to method of employment.

(3) The MILMO experienced greater survivability than the HMMWV or M3 CFV.

d. Organization design. The two 10-vehicle platoons, as designed, are appropriate for the scout's mission.

e. Equipment.

(1) The HMMWV and MILMO contributed significantly to each platoon's operational effectiveness.

(2) The non-dedicated Stinger missile effectively reduced losses to the air threat.

(3) The scout platoon requires a dismounted self-defense anti-armor capability.

f. The two 10-vehicle scout platoons are self-transportable and do not significantly impact on deployability.

g. Logistical supportability.

(1) Either 10-vehicle scout platoon is supportable within the existing support structure.

(2) The HMMWV Platoon demonstrated a vehicle Ao greater than the Mixed Platoon.

(3) The incorporation of a MILMO will require the stockage of repair parts not currently available in the inventory.

h. Training.

(1) An increased variety of optics, communications, weapons, and vehicles found in the 10-vehicle platoons increases individual training requirements. The HMMWV platoon, having less variety in optics, weapons and vehicles than the Mixed platoon required fewer unique individual training requirements.

(2) Training costs of the Mixed platoon are equal to that of the current platoon. The HMMWV platoon affords a significant reduction in training costs.

(3) The increased % of HMMWVs vice M3 CFVs will increase time available to train.

(4) Numerous institutional training courses would be impacted on with the fielding of a 10-vehicle scout platoon.

j. Safety. No new safety issues surfaced during the evaluation.

o. Summary. Table 18 summarizes how the three platoons compare relative to the evaluation issues.

Table 13. Comparison of Alternatives

<u>Element</u>	<u>M3 CFV</u> <u>(Baseline)</u>	<u>Mixed</u> <u>Platoon</u>	<u>HMMWV</u> <u>Platoon</u>
Mission Performance	0	+	++
Survivability	0	+	+
Logistical Supportability	0	0	++
Support Personnel	0	0	++
Deployability	0	0	0
Training Impact	0	-	+
Trng Cost (OPTEMPO/STRAC)	0	+	++
Unit Fielding Cost	0	+	++
Unit Personnel	0	-	0

- disadvantage  
0 equal to baseline  
+ advantage  
++ significant advantage

9. Recommendations:

- a. That the heavy battalion scout platoon be reconfigured to a 10-HMMWV and 4-MILMO configuration.
- b. That the platoon be validated when initially fielded to identify any remaining deficiencies.
- c. That doctrine be modified to allow the use of non-dedicated Stinger missiles in a self-defense role.
- d. That acquisition programs be initiated for non-inventory equipment which was tested and found to be worthwhile.
- e. That solutions to equipment deficiencies specified in Appendix F be pursued to conclusion.

# SCOUT PLATOON ALTERNATIVES

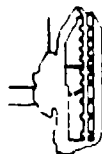
## CFV

## MIXED

## HMMWV



LT PLT LDR  
E5 GUNNER  
E4 SCT DVR  
E4 SCT  
E3 SCT



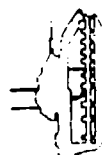
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E5 GUNNER  
E4 SCT DVR  
E4 SCT  
E3 SCT



E6 SEC LDR  
E5 GUNNER  
E4 SCT DVR  
E4 SCT  
E3 SCT



E6 SEC LDR  
E5 GUNNER  
E4 SCT DVR  
E4 SCT  
E3 SCT



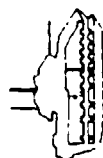
E6 SEC LDR  
E5 GUNNER  
E4 SCT DVR  
E4 SCT  
E3 SCT



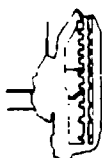
E6 SEC LDR  
E5 GUNNER  
E4 SCT DVR  
E4 SCT  
E3 SCT



LT PLT LDR  
E4 SCT DVR  
E3 SCT



E6 SEC LDR  
E5 GUNNER  
E4 CFV LDR  
E3 SCT



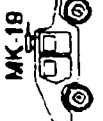
E6 SEC LDR  
E5 GUNNER  
E4 CFV DVR  
E3 SCT



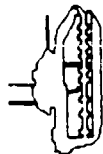
E6 SEC LDR  
E5 ASST SQ LDR  
E4 SCT DVR



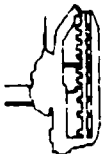
E6 SEC LDR  
E5 ASST SQ LDR  
E4 SCT DVR



E7 PLT SGT  
E4 SCT DVR  
E3 SCT



E6 SEC LDR  
E5 GUNNER  
E4 CFV DVR  
E3 SCT



E6 SEC LDR  
E5 GUNNER  
E4 CFV DVR  
E3 SCT



E5 ASST SQ LDR  
E4 SCT DVR  
E3 SCT



E5 ASST SQ LDR  
E4 SCT DVR  
E3 SCT



LT PLT LDR  
E4 SCT DVR  
E3 SCT



E6 SEC LDR  
E5 ASST SQ LDR  
E4 SCT DVR



E5 ASST SQ LDR  
E4 SCT DVR  
E3 SCT



E6 SEC LDR  
E5 ASST SQ LDR  
E4 SCT DVR



E5 ASST SQ LDR  
E4 SCT DVR  
E3 SCT



E7 PLT SGT  
E4 SCT DVR  
E3 SCT



E5 ASST SQ LDR  
E4 SCT DVR  
E3 SCT



E6 SQ LDR  
E4 SCT DVR  
E3 SCT



E5 ASST SQ LDR  
E4 SCT DVR  
E3 SCT



E6 SQ LDR  
E4 SCT DVR  
E3 SCT



## Appendix B. ADDED EQUIPMENT ITEMS

ITEM	BASIS OF ISSUE	MIXED PLATOON	HMMWV PLATOON
<b>OPTICS:</b>			
DRIVER'S THERMAL VIEWER	1/M3 CFV	4	
AN/UAS-11 NIGHT LR OBSERVATION DEVICE -OR- AN/UAS-12 TOW DAY/NIGHT SIGHT	1/HMMWV	6	10
AN/PVS-7/PVS-5 NIGHT VISION GOGGLES	24/PLT	24	24
BINOCULARS, STABILIZED HANDHELD, 14X	1/VEH	10	10
TELESCOPE, M-49	1/VEH	10	10
AN/PAQ-1 LASER TARGET DESIGNATOR	2/PLT	2	2
<b>WEAPONS:</b>			
MACHINE GUN, 40MM, MK-19 MOD III	1/HMMWV SEC	3	5
MACHINE GUN, 5-56MM, M249 (SAW)	1/HMMWV SEC (MTD) 1/M3 & HMMWV (DISMTD)	3 10	5 10
STINGER MISSILE	1/SEC	4	4
CARBINE, 5-56MM, XM4	1/MILMO	4	4
<b>COMMUNICATIONS:</b>			
AN/PRC-126 SMALL UNIT RADIO	6/PLT	6	6
AN/PSC-2 DIGITAL MESSAGE DEVICE	5/PLT	5	5
GLOBAL POSITIONING SYSTEM	6/PLT	6	6
QUICK ERECT ANTENNA MAST	2/PLT	2	2

Appendix C  
SCOUT CEP JANUS REPORT

1. Purpose. The Janus exercise was designed to examine operational effectiveness of two variations of the maneuver battalion scout platoon.

2. Background.

a. The current battalion scout platoon consists of six Cavalry Fighting Vehicles (CFV). Bradley Fighting Vehicle Systems (BFVS) were not originally designed to fill the reconnaissance role. They were designed as armored fighting vehicles and later adapted to perform the reconnaissance mission. They are large, noisy vehicles with an anti-armor fire capability. In field training exercises, CFVs' considerable signatures are readily acquired by opposing forces (OPFOR) units and the TOW missile systems on board attract the priority of fires afforded long range armor killers.

b. Two variations to the scout platoon have been proposed to add survivability and flexibility to the scout platoon through reduced signatures and greater numbers. Proposed scout platoons include High Mobility Multipurpose Wheeled Vehicles (HMMWV) and military motorcycles. One proposed scout platoon mixes six HMMWVs and four CFVs and includes a motorcycle mounted on the rear of four HMMWVs. A second proposed scout platoon consists of ten HMMWVs with four rear mounted motorcycles.

c. The Armor School developed a four-phased Concept Evaluation Program (CEP) to evaluate these alternative scout platoons: a front-end analysis, a validation test, a focused rotation at the National Training Center, and comparative analyses of the current scout platoon and two variations. This report describes the portion of the comparative analyses using the Janus wargame assets at Fort Knox, Kentucky.

3. Methodology.

a. Essential Elements of Analysis.

(1) What is the capability of each of the scout platoons to locate second echelon Threat positions?

(2) What is the capability of each of the scout platoons to provide early warning of the Threat counterattack?

(3) How survivable are each of the scout platoons?

b. Run Stream. The study incorporated a randomized run stream to produce ten iterations of the Janus wargame for each case examined. (Note: Due to an input data error discovered after the fact, one iteration of the MIX case was disallowed,

leaving only nine runs of this one case.) The three scout platoon cases were configured as follows in table 1.

Table 1 Scout Platoon Configurations

<u>CASE</u>	<u>SCOUT PLATOON</u>
BASE	6 CFVs
MIX	4 CFVs, 6 HMMWVs, 4 Motorcycles
PURE	10 HMMWVs, 4 Motorcycles

c. Scenario. The study wargamed TRADOC High Resolution Scenario #2 (HRS 2) using the Janus-T Tactical Simulation. This scenario portrays a Blue task force attacking a static motorized rifle battalion at 50% strength. The scout platoon was required to screen the task force flank during the initial phase of the attack. The scouts then maneuvered around the defender's flank to identify units moving to reinforce the defense or counterattack the Blue task force. This mission emphasized scouts not becoming decisively engaged and placed a premium on their use of stealth.

d. Force Structure. Initial opposing force structures are listed in table 2. Threat echelons are listed separately to distinguish the forces Blue scouts were attempting to locate. Blue force structure does not include the scout platoon since this was the variable in the experiment.

Table 2. Force Structures

<u>Blue</u>		<u>Red</u> <u>1st Echelon</u>		<u>Red</u> <u>2d Echelon</u>	
M1A1	44	FST II	3	FST II	10
M2	14	BMP-X	21	BMP-2	36
AH64	5	HAVOC	2	BRDM-2	3
AH-1S	5	HIND-E	2	AUTO RIFLEMAN	33
OH-58D	3	ZSU-X	2	GRENADIER	6
OH-58C	3	SA-13	2	MORTAR	6
LAW	13	SA-7	9		
DRAGON	9	AD GUNNER	18		
RIFLEMAN	50	RIFLEMAN	54		
GRENADIER	8	AUTO RIFLEMAN	18		
M60 MG	3	GRENADIER	2		
PIVAD	4	PK-M MG	18		
HOWITZER	101	HOWITZER	54		
MLRS	1	MRL	12		
MORTAR	6	MORTAR	24		
ENGR VEHICLES	6				

#### 4. Analysis.

##### a. Findings.

(1) Both ten vehicle alternative platoons added flexibility and increased the density of coverage by scout elements.

(2) The ten HMMWV/four motorcycle platoon located the most enemy positions and most frequently forewarned the task force commander of a counterattack.

(3) All three scout platoons were extremely vulnerable to enemy detection and fires. The greater number of vehicles in the two alternative platoons allowed those platoons to continue the mission longer.

(4) The Janus model did not portray the full advantages of the stealth characteristics of the lighter vehicles in the two alternative platoons.

##### b. Discussion.

(1) Measures of Effectiveness (MOE). The scout platoon's objectives in this scenario were to locate the enemy's second echelon positions and to provide early warning of a counterattack. The primary measures of the scout platoon's effectiveness, therefore, were the number of second echelon Threat elements detected and the identification of a counterattack. The scout platoon's capability for survival is a major factor in their ability to achieve their mission objectives. Less emphasis is placed on the task force's exchange ratios in this study. Though improved exchange ratios are an expected benefit of better reconnaissance, this is difficult to achieve in a relatively short Janus battle.

(a) Detections. To compare the alternative scout platoons' abilities to acquire a better picture of the battlefield, the study examined the number of unique detections of Threat elements. A unique detection was defined as the first time an enemy element was detected by a friendly system. This MOE eliminated multiple sightings of the same targets.

1 Total unique detections of all Threat elements (first and second echelons) are shown in Figure 1. The mixed platoon averaged 1 1/2 times as many detections of Threat elements as the base case. The pure HMMWV platoon detected the most Threat elements; 2.34 times the base case. The greater numbers of vehicles in the alternative scout platoons allowed greater flexibility and higher density of coverage than in the base case. Including the motorcycles, the alternative platoons have 14 sensors versus only six in the base case.

# UNIQUE DETECTIONS

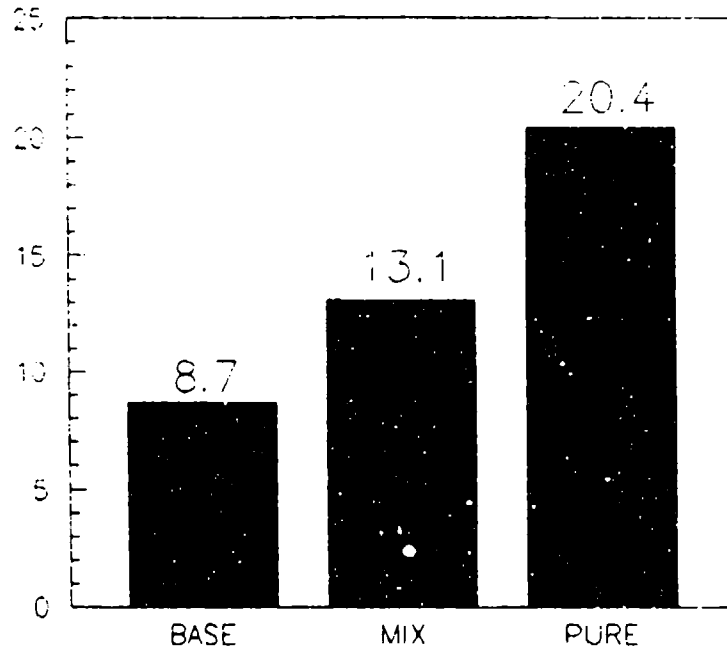


Figure 1. Total Unique Detections

2 The previous paragraph describes the unique detections of all Threat elements. Since the scouts' objective was to locate the second echelon elements, the number of unique detections of second echelon elements only are displayed in figure 2. Success in this MOE was a function of the scouts' depth of penetration and ability to reach good observation areas without being detected and eliminated by enemy fires. With this measure, the performance of the mixed platoon is much closer to the base case (average 4.0 detections vs 3.2 by the base case). Despite the greater numbers of vehicles initially, the mixed platoon was only able to penetrate with a few more vehicles than the base case. The CFVs in the mixed platoon suffered the same vulnerability as the base case and the HMMWVs survived only a short time longer (see the discussion of model limitations in paragraph 4b(3)). The pure HMMWV case however, achieved greater success with this measure. The ten HMMWVs and four motorcycles averaged eleven unique detections of second echelon elements. This is 3.44 times as many as the base case. An analysis of variance (ANOVA) test and a Mann-Whitney rank-sum test at the 99% confidence level verify that this is a statistically significant difference over the base case results. The mixed platoon was not significantly better than the base case. The success of the pure platoon in

this MOE may be attributed to the greater penetration of the scouts and their ability to reach good observation points. The motorcycles, with their smaller profiles, were especially successful in this regard.

#### UNIQUE DETECTIONS

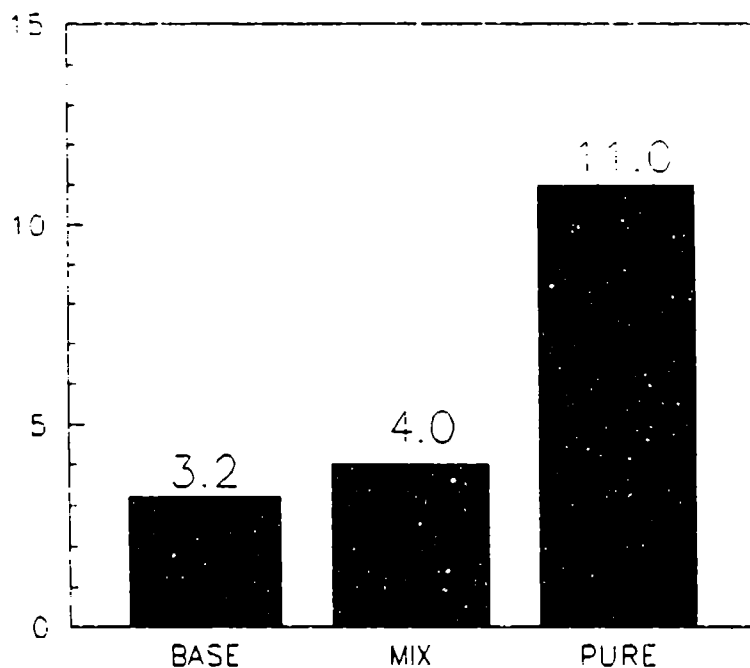


Figure 2. Second Echelon Unique Detections

(b) Early Warning. As each iteration of the wargame began, Blue scout platoon started its movement towards suspected second echelon positions. At this point, the two main forces were not in contact and Threat forces were stationary. The Blue task force commander was allowed to vary how he attacked the first echelon Threat forces. When the Threat commander felt he knew where the attack was coming he launched his counterattack. A major objective of the Blue scout platoon was to identify the counterattack and provide early warning to the Blue task force commander.

1 The base case scout platoon was only able to identify the counterattack in two out of ten iterations of the wargame. One of these identifications came too late to be considered an early warning. In several iterations, the wargame was stopped prior to launching of the counterattack because all of the scouts or too much of the Blue task force was already attrited.

2 The mixed platoon also was only able to identify the counterattack in two iterations. Again, in several iterations, the wargame was stopped before the counterattack occurred and in some iterations, scouts did not reach an observation point to see the counterattack.

3 The pure HMMWV scout platoon was the most successful in this MOE. This platoon provided early warning to the task force commander in five iterations and gave a late spot report in a sixth iteration. In two iterations, the scout platoon missed seeing the counterattack and in two battles, the scouts were killed before a counterattack was launched.

(c) Scout Survivability.

1 The scout platoons' mission was to locate the enemy and report back to the task force commander. Their job was not to engage the enemy. They were to avoid decisive engagement if possible. The scout vehicles in the wargame maintained a "hold fire" status until engaged by the enemy. This means that scout vehicles were not allowed to fire in the wargame unless they were receiving direct fires from enemy elements. This "hold fire" status was invoked to maintain better concealment.

2 One of the primary reasons the alternative scout platoons of this study were proposed was to use the advantages of the smaller, quieter vehicles to increase the survivability of the scout platoon. However, limitations of the Janus model restrict the degree of simulated benefit the alternative vehicles achieve from their stealth characteristics. These limitations are discussed in more detail in paragraph 4b(3) but essentially the only signature benefit simulated in the model is the minimum dimension (height, width, or length) of each alternative vehicle. Minimum detection dimensions used for these vehicles were 2.6 meters for the CFVs, 1.6 meters for the HMMWVs, and 0.5 meters for the motorcycles. Thus, HMMWVs and motorcycles had some advantage against detection over the CFVs but not the full benefits of reduced noise, vibrations, or smell. When detected, HMMWVs and motorcycles presented a smaller target than the CFVs but had none of the armor protection of the CFVs.

a These detection and vulnerability characteristics combined to produce similar survivability results for all the vehicles. CFVs were somewhat easier to detect but fewer of the Threat elements were capable of killing them. The HMMWVs were somewhat more difficult to detect, but with no armor protection, were more vulnerable to enemy infantrymen and artillery. Motorcycles were the most difficult to detect but were very vulnerable once located by the enemy.

b Thus, all three scout platoons suffered heavy losses in these wargames (figure 3). The base case scout platoon was generally combat ineffective within 20 minutes of game time. The

greater numbers of vehicles in the alternative cases provided more targets for the enemy and thus produced heavy scout losses in the first 20 minutes. However, the greater number of initial vehicles allowed the alternatives, especially the pure HMMWV case, to sustain the scout mission longer. The pure case, with all HMMWVs and motorcycles, was able to advance more vehicles into good observation positions.

#### SURVIVORS

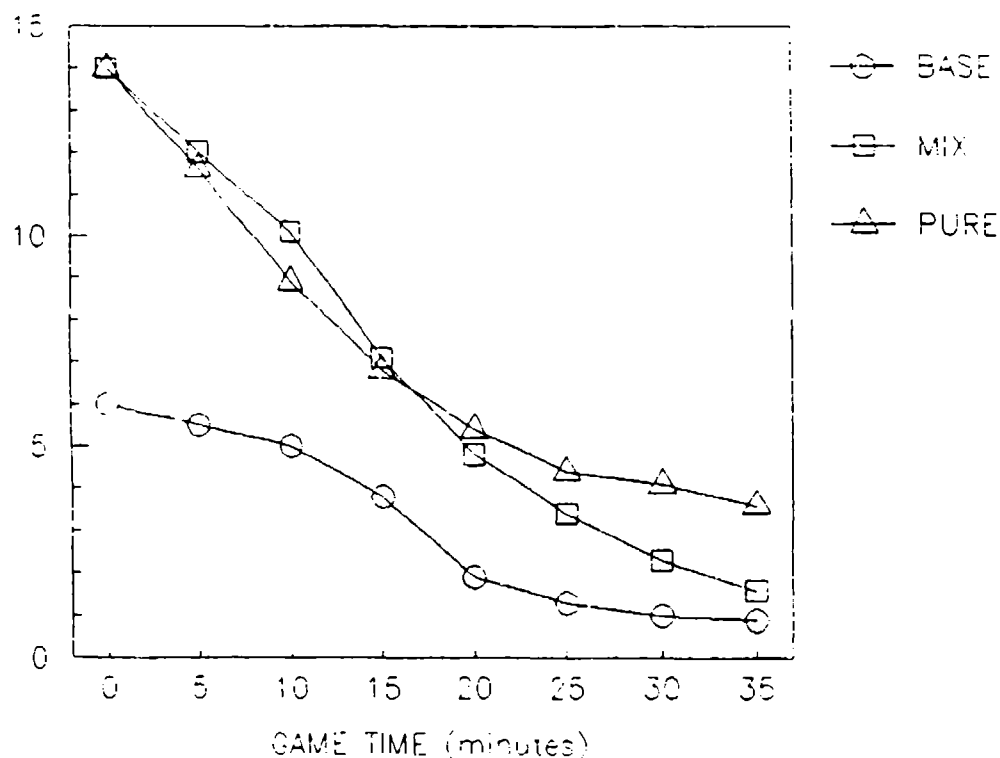


Figure 3. Scout Survivors Over Time.

c Figure 4 examines the scout survivors on a percentage of the platoon basis to negate the initial numbers advantage of the alternatives. This graphic shows closer loss rates with the base case taking proportionally fewer losses early but the pure HMMWV platoon sustains the longest. However, because of attrition, in most of the battle iterations, none of the three cases' scout platoons were capable of continuing their mission beyond this point. Perhaps this is a reflection of the tough mission requirements the scenario handed to the scouts. Each wargame ran until scout extinction or the task force reached its objective or was combat ineffective.



# PERCENT SURVIVORS

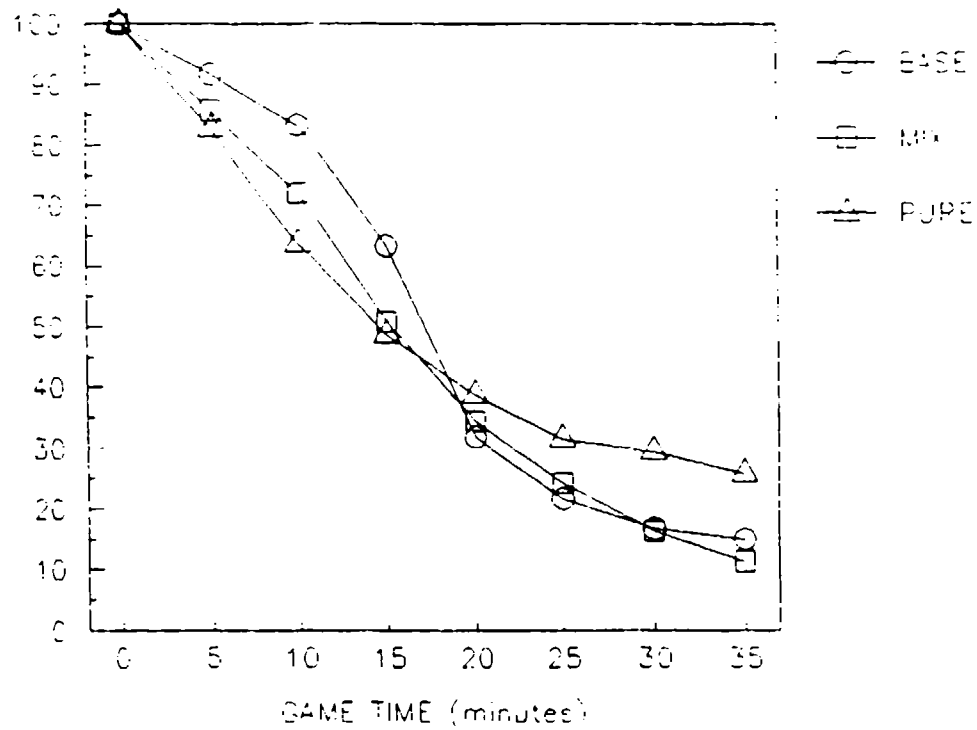


Figure 4. Percent Scout Survivors.

d Table 3 shows which Threat systems killed the Blue scout elements. The numbers reflect the totals for ten iterations of each case. These results show that most of the scout kills were achieved by the anti-armor systems (Tanks, APCs) which are capable of killing any kind of scout vehicle. Unarmored HMMWVs do not suffer a disproportionate number of small arms kills compared to the armored CFVs. Motorcycles, however, are more vulnerable to small arms fire.

Table 3. Who Killed Scouts?

<u>Base</u>		<u>CFV</u>		
	BMPs	30		
	FST II	19		
	HAVOC	2		
<u>Mix</u>		<u>CFV</u>	<u>HMMWV</u>	<u>Motorcycle</u>
	BMPs	27	33	17
	FST II	2	10	4
	Soldiers	3	1	14
	Artillery	-	8	-
<u>Pure</u>			<u>HMMWV</u>	<u>Motorcycle</u>
	BMPs		79	8
	FST II		3	1
	Soldiers		8	13
	Artillery		-	2

(2) Player Input. The players answered a short questionnaire after individual games concerning the scout platoon performance.

(a) A frequent player response was that there were not enough reconnaissance elements in the base case. The current platoon was not as flexible as the alternatives and the density of coverage is less. Suffering a few losses left the current scout platoon ineffective. The alternative platoons were generally robust enough to continue the mission despite suffering losses. This staying power allowed the alternative platoons to penetrate deeper and to reach better observation points.

(b) The scout platoon leader observed that the motorcycles were able to operate undetected in the same areas that CFVs were quickly spotted and killed.

(c) The player who filled the scout platoon leader's role is a field experienced scout platoon leader (21 months) with the current six CFV platoon. Before the gaming began, he was confident that he would succeed with the base case platoon. After a few iterations with each platoon in this study, he changed his thinking and stated he much preferred the flexibility and the greater density of coverage that the ten vehicle alternatives allowed.

(3) Limitations.

(a) Acquisition Module.

1 Enemy detection involves four of the five senses (sight, sound, smell, feel). Most computerized wargames generally only simulate line-of-sight vision. The acquisition module in Janus considers only the minimum dimension (height, width, length) when sizing its targets for optical sensors. Overall size is inconsequential. The primary factors in the acquisition module are minimum dimension, movement, and firings. When a potential target moves from its position or fires its weapon, its chances of being detected are greatly increased.

2 The primary reasons that HMMWVs and motorcycles are proposed as replacements for CFVs as scout vehicles is to benefit from the lower signatures associated with the smaller, quieter, lightweight vehicles and to add flexibility for greater density of coverage. The HMMWVs and motorcycles are thought to be capable of moving about the battlefield with less chance of detection while gathering information. The limitations of the acquisition module means that only the reduced minimum dimension of the vehicles has any effect on reducing their simulated detectability. The reduced overall profile of the vehicles, the reduced noise, the reduced odor of engine exhaust fumes, and the reduced ground vibrations associated with lighter vehicles are not considered in the module. Actually, one of the major advantages of the smaller vehicles, the ability to move around the battlefield, is a disadvantage in the acquisition module which keys on movement. Unfortunately for this exercise, the signature characteristics of the scout vehicles are essential for comparing the alternative scout platoons.

(b) Scout Maneuver.

1 The two alternative platoons had four motorcycles to use as mobile dismounts from the HMMWVs. The CFVs may use dismounted scouts to search for better observation points. These dismounted motorcycles and soldiers are dependent on their parent vehicles for support. They have only short range radios to report their findings. If their parent vehicles are destroyed, they are isolated in enemy territory without support. However, in the Janus model, these dismounts and motorcycles were fearless. Even after their parent vehicles were destroyed, they continued to scout as if totally independent. Their acquisitions showed on the screen for the task force commander to see, even if the task force was several kilometers away.

2 The scout platoon gamer could not control the "sneak and peek" aspect of the scout vehicles and dismounts as well as in reality. He could not quickly pull behind vegetation if he spotted enemy activity ahead. It was difficult to know if he was concealed behind a ridge in the terrain.

## 5. Conclusions.

a. Both ten vehicle alternative platoons added flexibility and increased the density of coverage by scout elements.

b. The ten HMMWV/four motorcycle platoon located the most enemy positions and most frequently forewarned the task force commander of a counterattack.

c. All three scout platoons were extremely vulnerable to enemy detection and fires. The greater number of vehicles in the two alternative platoons allowed those platoons to continue the mission longer.

d. The Janus model did not portray the full advantages of the stealth characteristics of the lighter vehicles in the two alternative platoons.



Appendix E-1. M3 CFV Platoon  
(Base Case)

TCE 17376L000  
03/01/90

TABLE OF ORGANIZATION AND EQUIPMENT

TCE 17376L000  
03/01/90

HHC, TK BN		17236J1 /17236J4		ARMY OF EXCELLENCE		STRENGTH LEVELS						AUG TYPE CADRE	
PARA LINE/	CHG ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DCPC	ASI/RNKS	1	2	3	A	B
LIN	NO							1 2 3 4					
02 SCOUT PLT HQ													
01	15	PLATOON LEADER	AAT	LT	12000	AR	P1	JX SR 11	1	1	1		
02	15	PLATOON SERGEANT	AAU	E-7	19040		P1	D3 J3 11	1	1	1		
03	15	DELETE	99Z										
04	15	DELETE	99Z										
05	15	SCOUT	A1A	E-4	19010		P1	D3	2	2	1		
06	15	SCOUT	A1A	E-3	19010		P1	D3	2	2	1		
07	15	CFV GUNNER	FAB	E-5	19020		P1	D3 11	2	2	1		
08	15	CFV DRIVER	FAB	E-4	19010		P1	D3 11	2	2	1		
PARA TOTAL									10	10	6		
A01872	51	DELETED											
A32060	27	DELETED											
A32355	27	B ALARM CHEMICAL AGENT AUTOMATIC: PORTABLE MANPACK M8A1							1	1	1		
A71712	51	DELETED											
A72260	07	DELETED											
A79381	07	A ANTENNA GROUP: DE-254(1)/ERC							2	2	2		
B67766		B BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/E							2	2	2		
C62375	48	B BATTERY CASE: 2-A1J-E1							4	4	4		
C65800	15	DELETED											
C68719		B CABLE TELEPHONE: WD-1/TT DR-B 1/2 KM							5	5	5		
C89145		C CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/O SPT SYS						760	4	4	4		
C89213		C CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT PLASTIC POLES						762	4	4	4		
C99989	15	DELETED											
D12087	15	DELETED											
E00533		B CHARGE RADIAC DETECTOR: PP-1578/PD							1	1	1		

TCE 17376L000

TCE 17376L000

TOE 17376L000  
03/01/90

TABLE OF ORGANIZATION AND EQUIPMENT

TOE 17376L000  
03/01/90

HHC, TK BN

17236J1 /17236J4 \*\*ARMY OF EXCELLENCE

PARA LINE/ LIN	CHG ERC NO	DESCRIPTION	SUTC	GRADE	MOS	BR	DCPC	STRENGTH LEVELS												AUG TYPE	CAD
								ASI/RNKS													
								1	2	3	4	1	2	3	4	5	6	7	8		
08	EY8103	08	A	ELEC TRANSFER KEYING DEVICE ETMD: KYK-13/TSEC									1	1	1						
	F60530	53	A	FIGHTING VEHICLE: FULL TRACKED CAVALRY HI SURVIVABILITY (CFV)									2	2	2						
	F91490		B	DEMOLITION SET EXPLOSIVE: INITIATING ELECTRIC AND SEMI ELECTRIC									1	1	1						
	602341		B	DETECTING SET MINE: PTBL METALLIC (AM/PSS-11)									2	2	2						
	K25866	54	C	HEATER RATION INDIVIDUAL: MOUNTED TROOPS									2	2	2						
	J87848	51	A	INST KIT: MK-2499/VRC FOR TSEC/KY-57 WITH SINGAR									4	4	4						
	L40063	09	A	LASER INFRARED OBSERVATION SET: AM/GVS-5									1	1	1						
	L44031	16	A	LAUNCHER GRENADE SMOKE: K257									2	2	2						
	L44595		A	LAUNCHER GRENADE 40 MILLIMETER: SINGLE SHOT RIFLE MTD DITCHBLE W/E									2	2	2						
	L44748	16		DELETED																	
	L91475	15		DELETED																	
	L92386		A	MACHINE GUN 7.62 MILLIMETER: LIGHT FLEXIBLE									2	2	2						
	M51419	15	C	MISSILE SIMULATION ROUND: (TON)									4	4	4						
	M74526	15		DELETED																	
	M75577	15		DELETED																	
	M75714		A	MOUNT TRIPOD MACHINE GUN: 7.62 MILLIMETER									2	2	2						
	M92420	15	A	MACHINE GUN 7.62 MILLIMETER: FIXED RM FEED									2	2	2						
	M04732	23	A	NIGHT VISION SIGHT INDIVIDUAL SERVED WEAPON: AM/PVS-4									2	2	2						
	M05050	22	A	NIGHT VISION SIGHT SET: AM/UAS-11									2	2	2						
	M05482	48	B	NIGHT VISION GOGGLE: AM/PVS-7B									6	6	6						
	M15518	22		DELETED																	
	Q20935		B	RADIOMETER: IM-93/UD									2	2	2						
	Q21483	47		DELETED																	
	Q34308	51		DELETED																	
	Q38299	48	B	RADIO SET: AM/PRC-77									2	2	2						
	Q53001	51		DELETED																	
	R20684	47	B	RADIAC SET: AM/VDR-2									1	1	1						
	R45271	51	A	RADIO SET: AM/VRC-91									2	2	2						
	R56742		B	REEL EQUIPMENT: CE-11									2	2	2						
	R59160		B	REELING MACHINE CABLE HAND: RL-39									2	2	2						
	S01373	48	D	SPEECH SECURITY EQUIPMENT: TSEC/KY-57									6	6	6						

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HMC, TX BN

17236J1 /17236J4 \*\*ARMY OF EXCELLENCE

PARA	LINE/	CHG	ERC	DESCRIPTION	SOTC	GRADE	MOS	BR	DCPC	AS1/RMKS				STRENGTH LEVELS			AUG	TYPE	CADR
										1	2	3	4	1	2	3	A	B	
08	S35741			B SAW CHAIN: GAS DRVN BAR FRAME W/ACCESS/COMPONENTS										1	1	1			
	V30252			B TELEPHONE SET: TA-1/PT										2	2	2			
	V31211			B TELEPHONE SET: TA-312/PT										1	1	1			
	V35477			B TELESCOPE STRAIGHT: MILITARY										2	2	2			
	V98788	08		A POWER SUPPLY VEHICLE: HYP-57/TSET										4	4	4			
	W80715	15		DELETED															
	Y03104	03		A VIEWER INFRARED: AN/PAS-7										2	2	2			
	Z25291	52		A ELECTRONIC NOTEBOOK (EN):										4	4	4			
	Z44650	4		B MOTORCYCLE: 2 WHEEL										2	2	2			
	Z50749	4		B PUMP: CAPTURED FUEL										2	2	2			
09				2 SCOUT SECTIONS															
	01	15		SECTION LEADER	ABY	E-6	19030		P1	03 11 95				1	1	1			
	02	15		SQUAD LEADER	ABY	E-6	19030		P1	03 11				3	2	2			
	03	15		DELETE	99Z														
	04	15		DELETE	99Z														
	05	15		DELETE	99Z														
	06	15		SCOUT	AIA	E-4	19010		P1	03 E9				4	3	3			
	07	15		SCOUT	AIA	E-3	19010		P1	03				4	3	3			
	08	15		DFV GUNNER	FAB	E-5	19020		P1	03 11				4	3	3			
	09	15		DFV DRIVER	FAA	E-4	19010		P1	03 11				4	3	3			
				PARA TOTAL										20	15	15			
	A01872	51		DELETED															
	A32060	27		DELETED															
	A32355	27		B ALARM CHEMICAL AGENT AUTOMATIC: PORTABLE MANPACK M8A1										2	2	2			
	A71712			B ANTENNA: AT-964/6										3	3	3			
	A72260	07		DELETED															
	A79381	07		A ANTENNA GROUP: DE-254(1)/GRC										1	1	1			
	B67766			B BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/E										4	4	4			
	C62375	48		B BATTERY CASE: 1-A13-E1										8	8	8			
	C65800	15		DELETED															

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HHC, TX BN

17236J1 /17236J4 \*\*ARMY OF EXCELLENCE

STRENGTH LEVELS

PARA LINE/ LIN	CHG NO	ERC	DESCRIPTION	SDTC	GRADE	MOS	SR	DCPC	AS1/RMKS				STRENGTH LEVELS			AUG	TYPE	CADRE
									1	2	3	4	1	2	3			
09	C68719		B CABLE TELEPHONE: WD-1/TT DR-8 1/2 KM										6	6	6			
	C89145		C CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/O SPT SYS							760			8	8	8			
	C89213		C CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT PLASTIC POLES							762			8	8	8			
	D12087	15	DELETED															
	E56896	15	DELETED															
	F60530	53	A FIGHTING VEHICLE: FULL TRACKED CAVALRY HI SURVIVABILITY (CFV)										4	4	4			
	H25866	54	C HEATER RATION INDIVIDUAL: MOUNTED TROOPS										4	4	4			
	J87848	51	A INST KIT: MW-2499/VRC FOR TSEC/KY-57 WITH SINGAR										8	8	8			
	L40063	09	A LASER INFRARED OBSERVATION SET: AN/GVS-5										2	2	2			
	L44031	16	A LAUNCHER GRENADE SMOKE: M257										4	4	4			
	L44595		A LAUNCHER GRENADE 40 MILLIMETER: SINGLE SHOT RIFLE MTD DITCHABLE W/E										4	4	4			
	L44748	16	DELETED															
	L45740	15	DELETED															
	L67021	16	DELETED															
	L91975	15	DELETED															
	L92386		A MACHINE GUN 7.62 MILLIMETER: LIGHT FLEXIBLE										4	4	4			
	M51419	15	C MISSILE SIMULATION ROUND: (TON)										8	8	8			
	M74526	15	DELETED															
	M75377	15	DELETED															
	M75714		A MOUNT TRIPOD MACHINE GUN: 7.62 MILLIMETER										4	4	4			
	M92420	15	A MACHINE GUN 7.62 MILLIMETER: FIXED RM FEED										4	4	4			
	N04732	23	A NIGHT VISION SIGHT INDIVIDUAL SERVED WEAPON: AN/PVS-4										4	4	4			
	N05050	22	A NIGHT VISION SIGHT SET: AN/UAS-11										1	1	1			
	N05482	48	B NIGHT VISION GOGGLE: AN/PVS-7B										12	12	12			
	N15518	22	DELETED															
	P06148		A PLATOON EARLY WARNING SYSTEM: AN/TRS-2(V)										2	2	2			
	Q20935		B RADIOMETER: IM-93/UD										4	4	4			
	Q21483	47	DELETED															
	Q34308	51	DELETED															
	Q38299	48	B RADIO SET: AN/PRC-77										4	4	4			
	Q53001	51	DELETED															

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PARA	LINE/	CHG	ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DOPC	ASI/RMKS				STRENGTH LEVELS			AUG	TYPE
										1	2	3	4	1	2	3		
C9	R20684	47	B	RADIAC SET: AN/VDR-2									2	2	2			
	R45271	51	A	RADIO SET: AN/VRC-91									4	4	4			
	R56742		B	REEL EQUIPMENT: CE-11									4	4	4			
	R59160		B	REELING MACHINE CABLE HAND: RL-39									2	2	2			
	S01373	48	B	SPEECH SECURITY EQUIPMENT: TSEC/KY-57									12	12	12			
	S35741		B	SAW CHAIN: GAS DRVN BAR FRAME W/ACCESS/COMPONENTS									2	2	2			
	V30252		B	TELEPHONE SET: TA-1/PT									4	4	4			
	V98788	08	A	POWER SUPPLY VEHICLE: HYP-57/TSEC									8	8	8			
	W80715	15		DELETED														
	Y03104	03	A	VIEWER INFRARED: AN/PAS-7									4	4	4			
	Z25291	52	A	ELECTRONIC NOTEBOOK (EN):									8	8	8			
	Z44650	48	B	MOTORCYCLE: 2 WHEEL									4	4	4			
10				HV' MORTAR PLT HQ														
	01	14		PLATOON LEADER	AAT	LT	12B60	AR	P1	JM J2			1	1	1			
	02			PLATOON SERGEANT	AAU	E-8	11C50		P1	F7 04			1	1	1			
	03			VEHICLE DRIVER	AAV	E-3	11C10		P1	04			1	1	1			
				PARA TOTAL									3	3	3			
	B67766		B	BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/E									2	2	2			
	C68719		B	CABLE TELEPHONE: WD-1/TT DR-8 1/2 KM									2	2	2			
	C89145		C	CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/O SPT SYS						760			4	4	4			
	C89213		C	CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT PLASTIC POLES						762			4	4	4			
	E98103	08	A	ELEC TRANSFER KEYING DEVICE ETXD: KYK-13/TSEC									1	1	1			
	J47457	51	A	INST KIT: MK-2326/VRC FOR AN/VRC-89/91/92 IN HMMWV									2	2	2			
	J87848	51	A	INST KIT: MK-2499/VRC FOR TSEC/KY-57 WITH SINCARS									4	4	4			
	K87243	25		DELETED														
	M05482	36	B	NIGHT VISION GOGGLE: AN/PVS-7B									4	4	4			
	Q20935		B	RADIOMETER: IM-93/UD									2	2	2			
	Q53001	51		DELETED														
	R45339	51	A	RADIO SET: AN/VRC-92									2	2	2			
	R59160		B	PEELING MACHINE CABLE HAND: RL-39									1	1	1			

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# Appendix E-2. Mixed Platoon

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## TABLE OF ORGANIZATION AND EQUIPMENT

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SCT PLT HMMV/CFV								**ARMY OF EXCELLENCE				STRENGTH LEVELS					
PARA LINE/	CHS SRC	DESCRIPTION	SOTC	GRADE	MOS	BF	DOPC	ASI/RMKS				AUG			TYPE	CADRE	
LIN	NO							1	2	3	4	1	2	3	A	B	C
01 SCT PLATOON MIX (MOD)																	
01		PLATOON LEADER	AAT	LT	12000	AR	P1	3X	SR			1	1	1			
02		PLATOON SERGEANT	AAU	E-7	19040		P1	D3	J3			1	1	1			
03		SECTION LEADER	ABT	E-6	19030		P1	D3	11			2	2	2			
04		SQUAD LEADER	ABY	E-6	19030		P1	D3	11			2	2	2			
05		SECTION LEADER	ABT	E-6	19030		P1	D3				1	1	1			
06		SQUAD LEADER	ABY	E-6	19030		P1	D3				1	1	1			
07		CFV GUNNER	FAB	E-5	19020		P1	D3	11			4	4	4			
08		ASST SQUAD LEADER	AEY	E-5	19020		P1	D3				4	4	4			
09		CFV DRIVER	FAA	E-4	19010		P1	D3	11			4	4	4			
10		SCOUT DRIVER	FAF	E-4	19010		P1	D3				6	4	2			
11		SCOUT	AIA	E-3	19010		P1	D3				8	7	5			
PARA TOTAL												34	31	27			
SRC TOTAL												34	31	27			
A30355		B ALARM CHEMICAL AGENT AUTOMATIC: PORTABLE MANPACK MBA1										6	6	6			
A71712		B ANTENNA: AT-984/6										6	6	6			
A79381		A ANTENNA GROUP: OE-254(1)/GRC										6	6	6			
B67766		B BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/E										14	14	14			
C62375		A BATTERY CASE: 2-A1J-E1										14	14	14			
C68719		B CABLE TELEPHONE: WD-1/TT DR-8 1/2 KM										10	10	10			
C89145		C CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/D SPT SYS						760				20	20	20			
C92213		C CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT PLASTIC POLES						762				20	20	20			
E00533		B CHARGER RACIAC DETECTOR: PP-1578/PD										2	2	2			
E98103		A ELEC TRANSFER KEYING DEVICE ETKD: KYK-13/7SEC										1	1	1			
F60462		A FIGHTING VEHICLE: FULL TRACKED CAVALRY (CFV)										4	4	4			
F91627		B DEMOLITION SET EXPLOSIVE: INITIATING NON ELECTRIC										2	2	2			
G02341		B DETECTING SET MINE: FIBL METALLIC (AN/PSS-11)										2	2	2			
H17660		C HARNESS GM EQUIP TRANSPORT: M4 (STINGER)										4	4	4			
J98501		A INTERROGATOR SET: AN/PP1-3 (STINGER)										4	4	4			
L40063		A LASER INFRARED OBSERVATION SET: AN/GVS-5										6	6	6			

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SCT FLT HMMV/CFV

\*\*ARMY OF EXCELLENCE

PARA	LINE/	CHG	ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DCPC	ASI/RMKS				STRENGTH LEVELS			AUG	TYPE	CA
										1	2	3	4	1	2	3			
01	L44031			A LAUNCHER GRENADE SMOKE: M257										4	4	4			
	M09009			A MACHINE GUN 5.56 MILLIMETER: M249										13	13	13			
	M14381			B MAST: AB-903/G										6	6	6			
	M51419			C MISSILE SIMULATION ROUND: (TOW)										8	8	8			
	M92362			A MACHINE GUN GRENADE 40MM: MK19 MOD III										3	3	3			
	M92420			A MACHINE GUN 7.62 MILLIMETER, FIXED RH FEED										4	4	4			
	N04596			A NIGHT VISION SIGHT CREW SERVED WEAPON: AN/TVS-5										3	3	3			
	N04732			A NIGHT VISION SIGHT INDIVIDUAL SERVED WEAPON: AN/PVS-4										13	13	13			
	N05050			A NIGHT VISION SIGHT SET: AN/UAS-11										6	6	6			
	N05482			A NIGHT VISION GOGGLE: AN/PVS-7B										24	24	24			
	P06148			A PLATOON EARLY WARNING SYSTEM: AN/TRS-2(V)										2	2	2			
	Q20935			B RADIOMETER: IM-93/UD										6	6	6			
	R20684			B RADIAC SET: AN/VDR-2										6	6	6			
	R45271			A RADIO SET: AN/VRC-91										10	10	10			
	R55268			A RADIO SET: AN/PRC-119										4	4	4			
	R56742			B REEL EQUIPMENT: CE-11										10	10	10			
	R59160			B REELING MACHINE CABLE HAND: RL-39										5	5	5			
	S01373			A SPEECH SECURITY EQUIPMENT: TSEC/KY-57										24	24	24			
	S35741			B SAW CHAIN: GAS DRVN BAR FRAME W/ACCESS/COMPONENTS										2	2	2			
	T00466			C TRAINER HANDLING GM LAUNCHER: M60 (STINGER)										4	4	4			
	T26207			A TARGET DESIGNATOR LASER: AN/PAQ-1 (LTD)										2	2	2			
	T92310			A TRUCK UTILITY: ARMT CARRIER ARMD 1-1/4 TON 4X4 W/E W/W (HMMV)										6	6	6			
	V30252			B TELEPHONE SET: TA-1/PT										8	8	8			
	V31211			B TELEPHONE SET: TA-312/PT										2	2	2			
	V35477			B TELESCOPE STRAIGHT: MILITARY										10	10	10			
	V49788			A POWER SUPPLY VEHICLE: HYP-57/TSEC										20	20	20			
	Y03104			A VIEWER INFRARED: AN/PAS-7										10	10	10			
	Z35054			A INST KIT: MK-2499/VRC FOR TSEC/KY-57 WITH SINGARS										20	20	20			
	Z44650			A MOTORCYCLE: 2 WHEEL										4	4	4			
	Z46324			A NAVSTAR GPS MANPACK/VEHICULAR SET:										6	6	6			
	Z69825			A NAVSTAR GPS M998 INSTALLATION KIT:										6	6	6			

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TABLE OF ORGANIZATION AND EQUIPMENT

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SCT PLT HMMWV/CFV

ARMY OF EXCELLENCE

STRENGTH LEVELS

PARA LINE/ LIN	CHG NO	ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DOPC	ASI/RMKS				AUS TYPE CADRE		
									1	2	3	4	A	B	C
01	280500		A INST KIT: MK-2326/VRC FOR AN/VRC-89/91/92 IN HMMWV							6	6	6			

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SCT PLT HMMV/CFV

ARMY OF EXCELLENCE

PARA LINE/ LIN	CHG NO	ERC	DESCRIPTION	SDTC	GRADE	MOS	RR	DCPC	ASI/RMKS			STRENGTH LEVELS			AUG	TYPE	CAD
									1	2	3	4	1	2			
RECAPITULATION BY GRADE																	
			OFFICERS		LT	12C00	AR	P1					1	1	1		
													1	1	1		
				OFFICERS TOTAL									1	1	1		
			ENLISTED		E-7	19D40		P1					1	1	1		
													1	1	1		
					E-6	19D30		P1					6	6	6		
													6	6	6		
					E-5	19D20		P1					8	8	8		
													8	8	8		
					E-4	19D10		P1					10	8	6		
													10	8	6		
					E-3	19D10		P1					8	7	5		
													8	7	5		
				ENLISTED TOTAL									33	30	26		
				SRC TOTAL									34	31	27		
RECAPITULATION BY MOS																	
			OFFICERS			12C00	AR	P1					1	1	1		
													1	1	1		
			ENLISTED			19D10		P1					18	15	11		
						19D20		P1					8	8	8		
						19D30		P1					6	6	6		
						19D40		P1					1	1	1		
				ENLISTED TOTAL									33	30	26		
				SRC TOTAL									34	31	27		

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SCT PLT HMMV/CFV

\*\*ARMY OF EXCELLENCE

													STRENGTH LEVELS						
PARA	LINE/	CHG	ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DCPC	ASI/RMKS							AUG	TYPE	CADRE
	LIN		NO							1	2	3	4	1	2	3	A	B	C
RECAPITULATION																			
A32355				B ALARM CHEMICAL AGENT AUTOMATIC: PORTABLE MANPACK M8A1							6			6	6	6			
A71712				B ANTENNA: AT-984/G							6			6	6	6			
A79381				A ANTENNA GROUP: DE-254(1)/GRC							6			6	6	6			
B67766				B BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/E							14			14	14	14			
C61375				A BATTERY CASE: Z-AIJ-E1							14			14	14	14			
C66719				B CABLE TELEPHONE: WD-1/TT DR-B 1/2 KM							10			10	10	10			
C89145				C CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/O SPT SYS							20			20	20	20			
C89213				C CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT PLASTIC POLES							20			20	20	20			
E00533				B CHARGER RADIAC DETECTOR: PP-1578/PD							2			2	2	2			
E98103				A ELEC TRANSFER KEYING DEVICE ETKD: KYX-13/TSEC							1			1	1	1			
F60462				A FIGHTING VEHICLE: FULL TRACKED CAVALRY (CFV)							4			4	4	4			
F91627				B DEMOLITION SET EXPLOSIVE: INITIATING NON ELECTRIC							2			2	2	2			
G02341				B DETECTING SET MINE: PTBL METALLIC (AN/PSS-11)							2			2	2	2			
H17660				C HARNESS GM EQUIP TRANSPORT: M4 (STINGER)							4			4	4	4			
J00501				A INTERROGATOR SET: AN/PPX-3 (STINGER)							4			4	4	4			
J40063				A LASER INFRARED OBSERVATION SET: AN/GVS-5							6			6	6	6			
J44031				A LAUNCHER GRENADE SMOKE: M257							4			4	4	4			
M09009				A MACHINE GUN 5.56 MILLIMETER: M249							13			13	13	13			
M14381				B MAST: AB-903/G							6			6	6	6			
M51419				C MISSILE SIMULATION ROUND: (TOW)							8			8	8	8			
M92352				A MACHINE GUN GRENADE 40MM: MK19 MOD II							3			3	3	3			
M92420				A MACHINE GUN 7.62 MILLIMETER: FIXED RH FEED							4			4	4	4			
N04596				A NIGHT VISION SIGHT CREW SERVED WEAPON: AN/TVS-5							3			3	3	3			
N04732				A NIGHT VISION SIGHT INDIVIDUAL SERVED WEAPON: AN/PVS-4							13			13	13	13			
N05050				A NIGHT VISION SIGHT SET: AN/UAS-11							6			6	6	6			
N05482				A NIGHT VISION GOGGLE: AN/PVS-7B							24			24	24	24			
P06148				A PLATOON EARLY WARNING SYSTEM: AN/TRS-2(V)							2			2	2	2			
Q20935				B RADIACETER: IM-93/UD							6			6	6	6			
Q20684				B RADIAC SET: AN/VDR-2							6			6	6	6			
R45271				A RADIO SET: AN/VRC-91							10			10	10	10			
R55268				A RADIO SET: AN/PRC-119							4			4	4	4			
R56742				B REEL EQUIPMENT: CE-11							10			10	10	10			
R59160				B REELING MACHINE CABLE HAND: RL-39							5			5	5	5			
S01373				A SPEECH SECURITY EQUIPMENT: TSEC/KY-57							24			24	24	24			
S35741				B SAW CHAIN: GAS DRVN BAR FRAME W/ACCESS/COMPONENTS							2			2	2	2			
T00466				C TRAINER HANDLING GM LAUNCHER: M60 (STINGER)							4			4	4	4			
T25207				A TARGET DESIGNATOR LASER: AN/PAR-1 (LTD)							2			2	2	2			
T92310				A TRUCK UTILITY: ARMT CARRIER ARMD 1-1/4 TON 4X4 W/E W/W (HMMV)							6			6	6	6			
V30252				B TELEPHONE SET: TA-1/PT							8			8	8	8			
V31211				B TELEPHONE SET: TA-312/PT							2			2	2	2			
V35477				B TELESCOPE STRAIGHT: MILITARY							10			10	10	10			
V98788				A POWER SUPPLY VEHICLE: HYF-57/TSEC							20			20	20	20			
Y03104				A VIEWER INFRARED: AN/PAS-7							10			10	10	10			
Z35054				A INST KIT: MK-2499/VRC FOR TSEC/KY-57 WITH SINGARS							20			20	20	20			
Z44650				A MOTORCYCLE: 2 WHEEL							4			4	4	4			

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TABLE OF ORGANIZATION AND EQUIPMENT

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SCT PLT HMMWV/CFV

\*\*ARMY OF EXCELLENCE

PARA LINE/ CHG ERC LIN NO	DESCRIPTION	SDTC	GRADE	MOS	BR	DCPC	STRENGTH LEVELS						AUG TYPE CA	
							ASI/RMKS				ARMY OF EXCELLENCE			AUG TYPE CA
							1	2	3	4	5	6	A	B

RECAPITULATION

DEVELOPMENTAL ITEMS

246324	A NAVSTAR GPS MANPACK/VEHICULAR SET:						6	6	6					
269825	A NAVSTAR GPS M998 INSTALLATION KIT:						6	6	6					
280500	A INST KIT: MK-2326/VRC FOR AN/VRC-89/91/92 IN HMMWV						6	6	6					



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TABLE OF ORGANIZATION AND EQUIPMENT

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SCT PLT HMMV/CFV

\*\*ARMY OF EXCELLENCE

STRENGTH LEVELS

PARA	LIN	CHG	ERC	DESCRIPTION	SOTC	GRADE	MOS	BR	DCPC	ASI/RMS	STRENGTH LEVELS			AUG	TYPE	CADRE
	LIN	NO								1	2	3	4	A	B	C
				REMARKS												
	31			OFFICER: M2 BRADLEY INFANTRY FIGHTING VEHICLE/M3 CAVALRY FIGHTING VEHICLE												
	SR			OFFICER: RANGER												
	03			ENLISTED: BRADLEY FIGHTING VEHICLE SYSTEM (BFVS) REPAIRER												
	J3			ENLISTED: BRADLEY INFANTRY FIGHTING VEHICLE (BIFV) SYSTEM MASTER GUNNER												
	11			ARMED WITH PISTOL/REVOLVER												
	760			SUBSTITUTION OF LIN C89085 OR C89128 IS AUTHORIZED WHEN UNIT IS OPERATING IN DESERT OR SNOW ENVIRONMENT, RESPECTIVELY												
	762			SUBSTITUTION OF LIN C89070 OR C89064 IS AUTHORIZED WHEN UNIT IS OPERATING IN DESERT OR SNOW ENVIRONMENT, RESPECTIVELY												

# Appendix E-3. HMMWV Platoon

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## TABLE OF ORGANIZATION AND EQUIPMENT

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SCOUT PLATOON HMMWV										**ARMY OF EXCELLENCE				STRENGTH LEVELS					
PARA LINE/	CHG	ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DCPC	ASI/RMKS				AUG			TYPE CADRE			
LT4	NO								1	2	3	4	1	2	3	A	B	C	
01			SCOUT PLT HMMWV (MOD)						AAA		AAA								
01			PLATOON LEADER	AAT	LT	12000	AR	P1	SR				1	1	1				
02			PLATOON SERGEANT	AAU	E-7	19040		P1					1	1	1				
03			SECTION LEADER	ABT	E-6	19030		P1					2	2	2				
04			SQUAD LEADER	ABY	E-6	19030		P1					2	1	1				
05			ASST SQUAD LEADER	AEY	E-5	19020		P1					6	5	4				
06			SCOUT DRIVER	FAF	E-4	19010		P1					10	9	8				
07			SCOUT	AIA	E-3	19010		P1					8	8	7				
PARA TOTAL													30	27	24				
SRC TOTAL													30	27	24				
A30303			S ALARM CHEMICAL AGENT AUTOMATIC: PORTABLE MANPACK M8A1										6	6	6				
A71712			B ANTENNA: AT-984/6										6	6	6				
A79381			A ANTENNA GROUP: DE-25A(1)/GRC										6	6	6				
B67766			B BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X30MM W/E										14	14	14				
C62375			A BATTERY CASE: Z-AIJ-E1										14	14	14				
C68719			B CABLE TELEPHONE: WD-1/TT DR-8 1/2 KM										10	10	10				
C89145			C CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/O SPT SYS							760			20	20	20				
C89213			C CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT PLASTIC POLES							762			20	20	20				
E80533			B CHARGER RADIAC DETECTOR: PP-1578/PD										2	2	2				
E91103			A ELEC TRANSFER KEYING DEVICE ETXD: KYK-13/TSEC										1	1	1				
F91627			B DEMOLITION SET EXPLOSIVE: INITIATING NON ELECTRIC										2	2	2				
G02341			B DETECTING SET MINE: PT&L METALLIC (AN/PSS-11)										2	2	2				
H17660			C HARNESS GN EQUIP TRANSPORT: M4 (STINGER)										4	4	4				
J95501			A INTERROGATOR SET: AN/PPX-J (STINGER)										4	4	4				
L40060			A LASER INFRARED OBSERVATION SET: AN/GVS-5										10	10	10				
M09009			A MACHINE GUN 5.56 MILLIMETER: M249										15	15	15				
M14361			B MAST: AB-903/G										4	6	6				
M92362			A MACHINE GUN GRENADE 40MM: MK19 MOD III										5	5	5				
N04596			A NIGHT VISION SIGHT CREW SERVED WEAPON: AN/PVS-5										5	5	5				
N04732			A NIGHT VISION SIGHT INDIVIDUAL SERVED WEAPON: AN/PVS-4										15	15	15				

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SCOUT PLATOON HMMV

ARMY OF EXCELLENCE

PARA	LINE/	CHG	ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DOPC	ASI/RMKS				STRENGTH LEVELS			AUG TYPE	
										1	2	3	4	1	2	3	A	B
01	N05050			A NIGHT VISION SIGHT SET: AN/UAS-11										10	10	10		
	N05482			A NIGHT VISION GOGGLE: AN/PVS-7B										24	24	24		
	P06148			A PLATOON EARLY WARNING SYSTEM: AN/TRS-2(V)										2	2	2		
	Q20935			B RADIOMETER: IM-93/UD										6	6	6		
	R20684			B RADIO SET: AN/VDR-2										6	6	6		
	R45271			A RADIO SET: AN/VRC-91										10	10	10		
	R55268			A RADIO SET: AN/PRC-119										4	4	4		
	R56742			B REEL EQUIPMENT: CE-11										10	10	10		
	R59160			B REELING MACHINE CABLE HAND: RL-39										5	5	5		
	S01373			A SPEECH SECURITY EQUIPMENT: TSEC/KY-57										24	24	24		
	S35741			B SAW CUT: GAS DRVN BAR FRAME W/ACCESS/COMPONENTS										2	2	2		
	T00466			C TRACKER HANDLING GM LAUNCHER: M60 (STINGER)										4	4	4		
	T26207			A TARGET DESIGNATOR LASER: AN/PAQ-1 (LTD)										2	2	2		
	T92310			A TRUCK UTILITY: ARMT CARRIER ARMD 1-1/4 TON 4X4 W/E W/M (HMMV)										10	10	10		
	V30252			B TELEPHONE SET: TA-1/PT										8	8	8		
	V31211			B TELEPHONE SET: TA-312/PT										2	2	2		
	V35477			B TELESCOPE STRAIGHT: MILITARY										10	10	10		
	V99788			A POWER SUPPLY VEHICLE: HYP-57/TSEC										20	20	20		
	Y03104			A VIEWER INFRARED: AN/PAS-7										10	10	10		
	Z35054			A INST KIT: MK-2499/VRC FOR TSEC/KY-57 WITH SINGARS										20	20	20		
	Z44650			A MOTORCYCLE: 2 WHEEL										4	4	4		
	Z46324			A NAVSTAR GPS MANPACK/VEHICULAR SET:										6	6	6		
	Z69825			A NAVSTAR GPS M998 INSTALLATION KIT:										6	6	6		
	Z00500			A INST KIT: MK-2326/VRC FOR AN/VRC-89/91/92 IN HMMV										10	10	10		

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TABLE OF ORGANIZATION AND EQUIPMENT

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SCOUT PLATOON HMMV

\*\*ARMY OF EXCELLENCE

PARA LINE/ CHG ERC		DESCRIPTION	SDTC	GRADE	MOS	BR	DCPC	ASI/RMKS				STRENGTH LEVELS			AUG TYPE CADRE		
LIN	NO							1	2	3	4	1	2	3	A	B	C
RECAPITULATION BY GRADE																	
		OFFICERS		LT	12C00	AR	P1				1	1	1				
											1	1	1				
			OFFICERS TOTAL								1	1	1				
		ENLISTED		E-7	19D40		P1				1	1	1				
											1	1	1				
				E-6	19D30		P1				4	3	3				
											4	3	3				
				E-5	19D20		P1				6	5	4				
											6	5	4				
				E-4	19D10		P1				10	9	8				
											10	9	8				
				E-3	19D10		P1				8	8	7				
											8	8	7				
			ENLISTED TOTAL								29	26	23				
			SRC TOTAL								30	27	24				
RECAPITULATION BY MOS																	
		OFFICERS		12C00	AR		P1				1	1	1				
			OFFICERS TOTAL								1	1	1				
		ENLISTED		19D10			P1				18	17	15				
				19D20			P1				6	5	4				
				19D30			P1				4	3	3				
				19D40			P1				1	1	1				
			ENLISTED TOTAL								29	26	23				
			SRC TOTAL								30	27	24				

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SCOUT PLATOON HMMV

ARMY OF EXCELLENCE

PARA LINE/ CHG ERO LIN NO	DESCRIPTION	SDTC	GRADE	MOS	BR	DOPC	STRENGTH LEVELS									
							ASI/RMKS		1		2		3		AUG TYPE CADRE	
							1	2	3	4	1	2	3	4	B	C
	RECAPITULATION															
A32355	B ALARM CHEMICAL AGENT AUTOMATIC: PORTABLE MANPACK M8A1										6	6	6			
A71712	B ANTENNA: AT-984/6										6	6	6			
A79381	A ANTENNA GROUP: CE-254(1)/GRC										6	6	6			
B07733	B BINOCULAR: MODULAR CONSTRUCTION MIL SCALE RETICLE 7X50MM W/E										14	14	14			
C62375	A BATTERY CASE: 2-A13-E1										14	14	14			
C62719	B CABLE TELEPHONE: WD-1/TT DR-6 1/2 KM										10	10	10			
C89145	C CAMOUFLAGE SCREEN SYSTEM: WOODLAND LT WT RADAR SCAT W/O SPT SYS										20	20	20			
C89213	C CAMOUFLAGE SCREEN SUPPORT SYSTEM: WOODLAND/DESERT PLASTIC POLES										20	20	20			
E00533	B CHARGER RADIAC DETECTOR: PF-1578/PD										2	2	2			
E98103	A ELEC TRANSFER KEYING DEVICE ETKD: KYK-13/TSEC										1	1	1			
F91627	B DEMOLITION SET EXPLOSIVE: INITIATING NON ELECTRIC										2	2	2			
G02341	B DETECTING SET MINE: PTBL METALLIC (AN/PSS-11)										2	2	2			
H17660	C HARNESS GM EQUIP TRANSPORT: M4 (STINGER)										4	4	4			
J98501	A INTERROGATOR SET: AN/PPX-3 (STINGER)										4	4	4			
L40063	A LASER INFRARED OBSERVATION SET: AN/6VS-5										10	10	10			
M09009	A MACHINE GUN 5.56 MILLIMETER: M249										15	15	15			
M14381	B MAST: AB-903/6										6	6	6			
M92362	A MACHINE GUN GRENADE 40MM: MK19 MOD III										5	5	5			
N04596	A NIGHT VISION SIGHT CREW SERVED WEAPON: AN/TVS-5										5	5	5			
N04732	A NIGHT VISION SIGHT INDIVIDUAL SERVED WEAPON: AN/PVS-4										15	15	15			
N05050	A NIGHT VISION SIGHT SET: AN/UAS-11										10	10	10			
N05482	A NIGHT VISION GOGGLE: AN/PVS-7B										24	24	24			
P06148	A PLATOON EARLY WARNING SYSTEM: AN/TRS-2(V)										2	2	2			
Q20935	B RADIAC METER: IM-93/UD										6	6	6			
R20484	B RADIAC SET: AN/VDR-2										6	6	6			
R45271	A RADIO SET: AN/VRC-91										10	10	10			
R55268	A RADIO SET: AN/PRC-119										4	4	4			
R56742	B REEL EQUIPMENT: CE-11										10	10	10			
R59160	B REELING MACHINE CABLE HAND: RL-39										5	5	5			
S01373	A SPEECH SECURITY EQUIPMENT: TSEC/KY-57										24	24	24			
S35741	B SAW CHAIN: GAS DRVN BAR FRAME W/ACCESS/COMPONENTS										2	2	2			
T00466	C TRAINER HANDLING GM LAUNCHER: M60 (STINGER)										4	4	4			
T26267	A TARGET DESIGNATOR LASER: AN/PAQ-1 (LTD)										2	2	2			
T92310	A TRUCK UTILITY: ARMT CARRIER ARMD 1-1/4 TON 4X4 W/E W/W (HMMV)										10	10	10			
V30252	B TELEPHONE SET: TA-1/PT										8	8	8			
V31211	B TELEPHONE SET: TA-312/PT										2	2	2			
V35477	B TELESCOPE STRAIGHT: MILITARY										10	10	10			
V96789	A POWER SUPPLY VEHICLE: HYF-57/TSEC										20	20	20			
Y03117	A VIEWER INFRARED: AN/PAS-7										10	10	10			
Z35654	A INST KIT: MK-2499/VRC FOR TSEC/KY-57 WITH SINGARS										20	20	20			
Z44650	A MOTORCYCLE: 2 WHEEL										4	4	4			
Z46324	A NAVSTAR GPS MANPACK/VEHICULAR SET:										6	6	6			
Z64925	A NAVSTAR GPS M998 INSTALLATION KIT:										6	6	6			
ZB9500	A INST KIT: MK-3726/VRC FOR AN/VRC-89/91/92 IN HMMV										10	10	10			

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TABLE OF ORGANIZATION AND EQUIPMENT

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SCOUT PLATOON HMMWV

\*\*ARMY OF EXCELLENCE

STRENGTH LEVELS

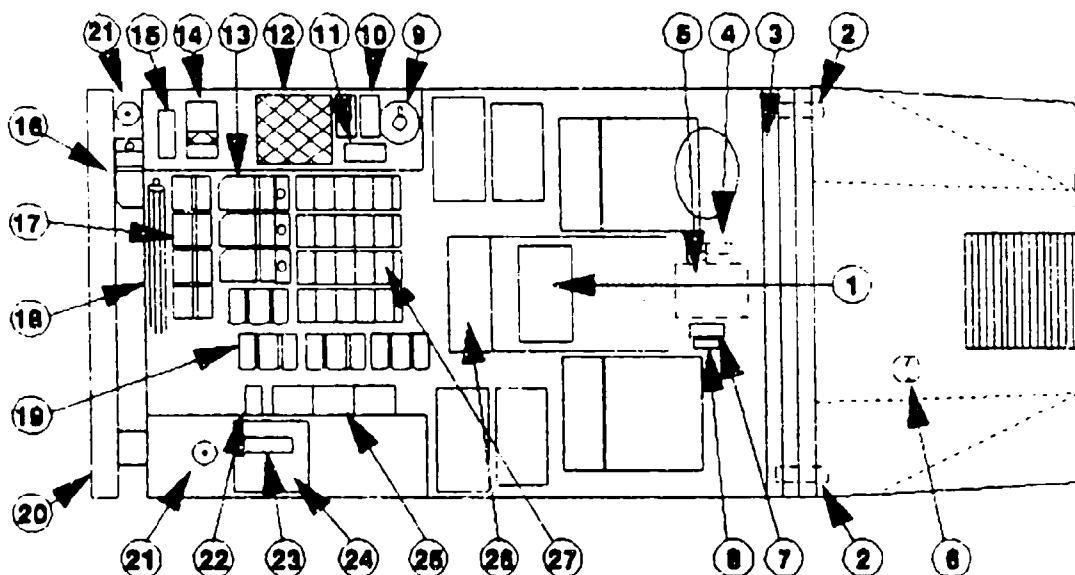
PARA	LINE/	CHG	ERC	DESCRIPTION	SDTC	GRADE	MOS	BR	DCPC	ASI/RMKS				STRENGTH LEVELS			AUG	TYPE	CADRE
										1	2	3	4	1	2	3			
				REMARKS															
	5R			OFFICER: RANGER															
	760			SUBSTITUTION OF LIN C89085 OR C89128 IS AUTHORIZED WHEN UNIT IS OPERATING IN DESERT OR SNOW ENVIRONMENT, RESPECTIVELY															
	762			SUBSTITUTION OF LIN C89070 OR C89064 IS AUTHORIZED WHEN UNIT IS OPERATING IN DESERT OR SNOW ENVIRONMENT, RESPECTIVELY															

# Appendix F

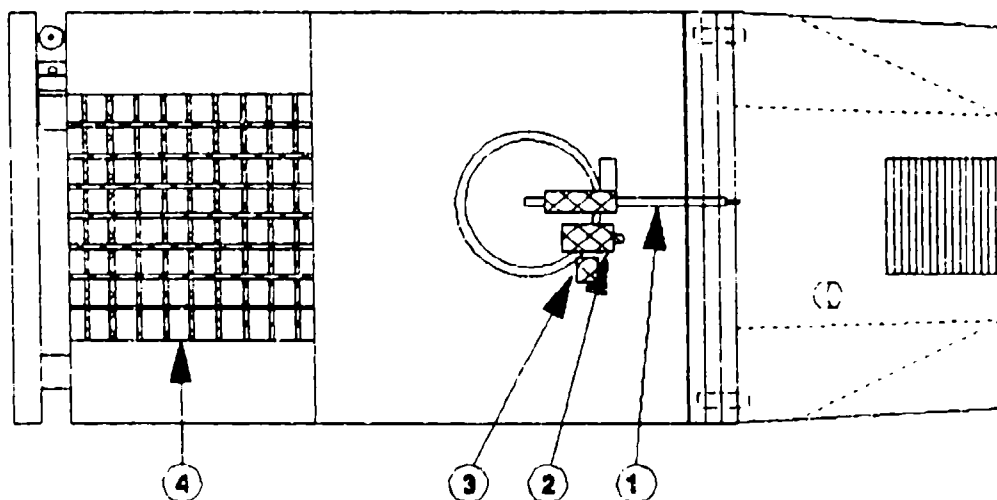
## EQUIPMENT ISSUES

ITEM	ISSUE	FIX
<b>OPTICS:</b>		
AN/UAS-11 NIGHT LR OBSERVATION DEVICE	COOLANT BOTTLE	FY91 MODIFICATION
AN/UAS-12 TOW DAY/NIGHT SIGHT	HIGH SILHOUETTE	REPLACE WITH AN/UAS-11
AN/PVS-7/PVS-5 NIGHT VISION GOGGLES	MILMO HELMET INTERFACE	MODIFY MOUNT
BINOCULARS, STABILIZED HANDHELD, 14X	RELIABILITY	NDI ACQUISITION W/MODIFICATION
BINOCULARS, M22, 7X50	LENSE LASER COATING	MODIFICATION
AN/PAG-1 LASER TARGET DESIGNATOR	INSUFFICIENT RANGE	MODIFY/ACQUISITION PROGRAM
AN/PAS-7 VIEWER, INFRARED	POOR IMAGE QUALITY	REPLACE WITH TWS (FY94)
AN/GVS-5, HAND HELD LASER RGE FINDER	NOT EYESAFE	MATERIEL CHANGE/PROGRAM START
<b>WEAPONS:</b>		
MACHINE GUN, 5.56MM, M249 (SAW)	UNAVAILABLE	FIELDING PLAN
STINGER MISSILE	NON-DEDICATED DOCTRINE	PURSUE REVISION OF DOCTRINE
<b>COMMUNICATIONS:</b>		
AN/VRC-126 SMALL UNIT RADIO	RANGE, SECURE CAPABILITY	REPLACE WITH AN/VRC-119
AN/PSC-2 DIGITAL MESSAGE DEVICE	NOT USER FRIENDLY	DELETED
GLOBAL POSITIONING SYSTEM (GPS)	IMMATURE SATELLITE SYSTEM	ENSURE REQUIREMENTS JUSTIFIED
QUICK ERECT ANTENNA MAST	ERECTING	FIX VIA QUICK ERECT ANTENNA MAST PROGRAM
<b>VEHICLES:</b>		
MOTORCYCLE	PROGRAM FUNDING	PURSUE FUNDING
HAMMY	PROTOTYPE RACK MOUNT	INITIATE ACQUISITION PROGRAM
	SURVIVABILITY	MODIFY MISSION NEEDS STATEMENT
	SELF-RECOVERY	REPLACE WITH VARIANT W/MINCH

# LOAD PLAN: HMMWV W/M60 MACHINE GUN



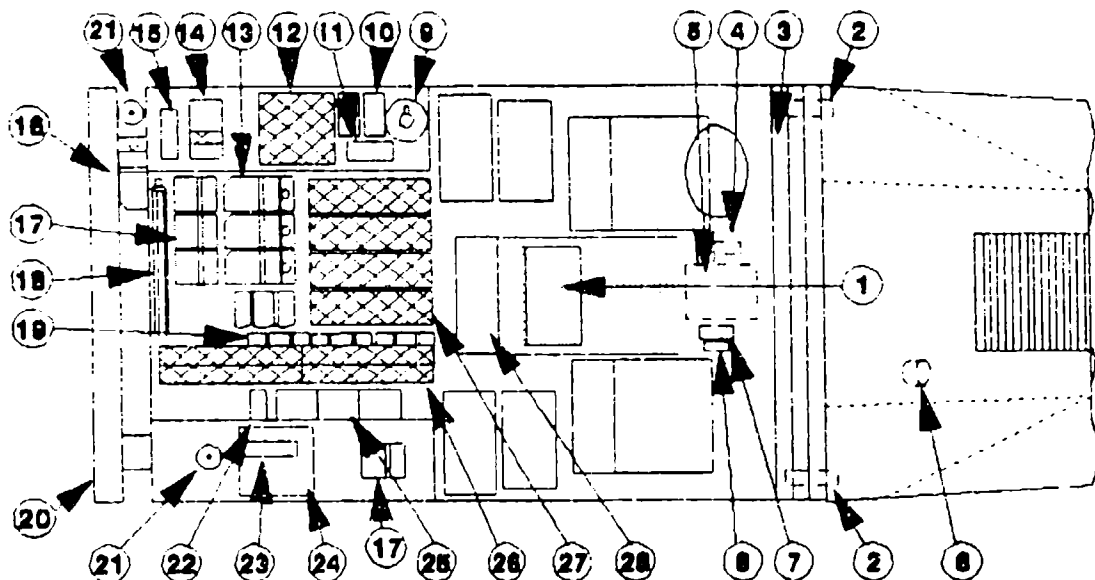
- |                           |                     |                          |
|---------------------------|---------------------|--------------------------|
| 1 GPB (MTD ON FLOOR)      | 10 GASOLINE STOVE   | 19 RUCKSACKS x4          |
| 2 M-16 RIFLE              | 11 M-8 CONSOLE      | 20 MILMO MOUNTING RACK   |
| 3 FLASHLIGHT              | 12 5.56MM AMMO      | 21 RADIO ANTENNA         |
| 4 BINOCULARS              | 13 WATER CAN x2     | 22 NIGHT SIGHT BATTERIES |
| 5 AN/GRC-180              | 14 CABLE DR-8       | 23 SPARE M-60 MG BARREL  |
| 6 TBEC/KY-87              | 15 TELEPHONE        | 24 COMBAT RATIONS (MRE)  |
| 7 M-8 ALARM               | 16 FUEL CAN (MILMO) | 25 COLLANT BOTTLES x2    |
| 8 POWER CONDITIONER PBC-2 | 17 SLEEPING ROLL x4 | 26 DEMOLITIONS (C-4)     |
| 9 M-11 DECON APPARATUS    | 18 TRIPOD           | 27 7.62MM AMMO           |



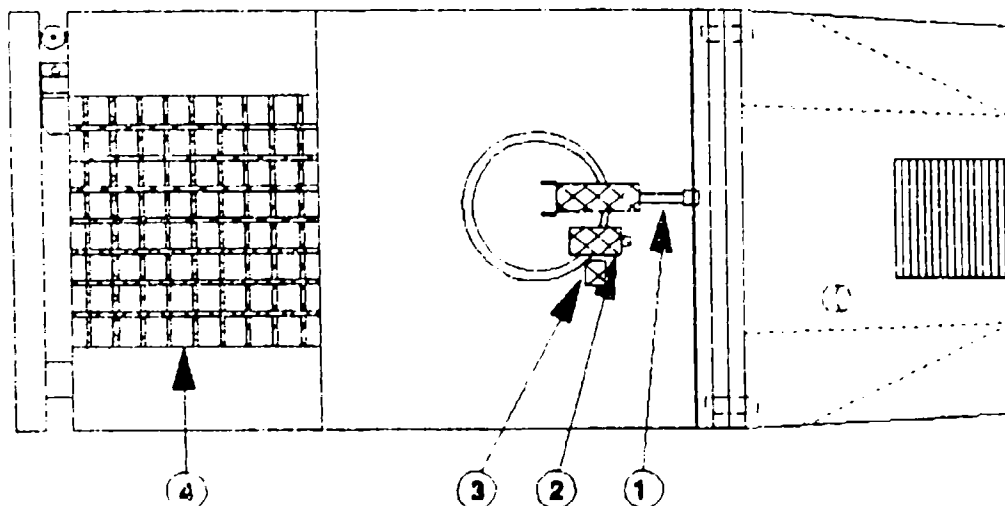
- |                       |                      |
|-----------------------|----------------------|
| 1 M60 MACHINE GUN     | 3 LASER RANGE FINDER |
| 2 THERMAL NIGHT SIGHT | 4 BACK HATCH REMOVED |



## LOAD PLAN: HMMWV W/MK-19 MACHINE GUN



- |                           |                     |                           |
|---------------------------|---------------------|---------------------------|
| 1 GPS (MTD ON FLOOR)      | 10 GASOLINE STOVE   | 19 RUCKSACKS x4           |
| 2 M-16 RIFLE              | 11 M-8 CONSOLE      | 20 MILMO MOUNTING RACK    |
| 3 FLASHLIGHT              | 12 5.56MM AMMO      | 21 RADIO ANTENNA          |
| 4 BINOCULARS              | 13 WATER CAN x3     | 22 NIGHT SIGHT BATTERIES  |
| 5 AN/GRC-180              | 14 CABLE DR-6       | 23 SPARE M8 ALARM BATTERY |
| 6 TSEC/KY-67              | 15 TELEPHONE        | 24 COMBAT RATIONS (MRE)   |
| 7 M-8 ALARM               | 16 FUEL CAN (MILMO) | 25 COLLANT BOTTLES x2     |
| 8 POWER CONDITIONER PBC-2 | 17 SLEEPING ROLL x4 | 26 STINGER MISSILES       |
| 9 M-11 DECON APPARATUS    | 18 TRIPOD           | 27 40MM AMMO (MK19)       |
|                           |                     | 28 DEMOLITIONS (C-4)      |



- |                       |                      |
|-----------------------|----------------------|
| 1 MK-19 MACHINE GUN   | 3 LASER RANGE FINDER |
| 2 THERMAL NIGHT SIGHT | 4 BACK HATCH REMOVED |

# Appendix H. MILMO PLI. Requirements

Survey responses to: "What MILMO PLL should be with the scout platoon?"

<u>Item</u>	<u>Mixed Platoon</u>	<u>HMMWV Platoon</u>	<u>Total</u>
POL:			
Fuel/Fuel Cans	17	24	41
Oil	14	28	42
Grease	11	17	28
CONTROLS:			
Brake/Clutch Levers	24	11	35
Brake/Clutch Cables	19	9	28
Brake Pedals	0	1	1
Foot Peds	1	1	2
Handle Bars	1	3	4
INSTRUMENTS:			
Speedometer/Tachometer Cable	0	1	1
Instrument Lightbulbs	1	2	3
Gauges	0	1	1
DRIVE TRAIN:			
Spark Plugs	3	6	9
Filters	1	4	5
Tires	21	9	30
Inner Tubes	16	2	18
Chain/Chain Link	14	9	23
Sprocket	14	2	16
Wheels	0	3	3
Muffler	0	1	1
TOOLS:			
Air Pump	2	1	3
"Fix Flat"	0	2	2
Tool Kit	3	10	13
Tire Repair Kit	0	1	1
Wire Cutters	0	1	1
None	22	14	36

## **Appendix I. Logistical Support Ability**

### **1. PURPOSE:**

The purpose of this study is to analyze two variations in structure of the Battalion Scout Platoon, and determine if the variations are logistically supportable. This is Issue 4 in the Concept Evaluation Program (CEP) of the Maneuver Battalion Scout Platoon Validation. The results of this analysis and the analysis of the other CEP issues will be used to support a decision to reconfigure the maneuver battalion scout platoon.

### **2. FINDINGS:**

Logistic impacts associated with the two new scout platoon variations are minimal. Problems identified during testing providing maintenance and repair parts for the Military motorcycle will be solved when the motorcycles become issued equipment.

### **3. BACKGROUND:**

The CEP evolved from the General Officer Executive Council recommendations to correct the scout platoon's deficiencies. Data to perform the CEP evaluation is being collected from four sources:

- front end analysis
- Fort Stewart phase
- National Training Center focused rotation
- comparative analysis of variations and base case

The data used in this analysis was collected from questionnaires given to participants in the Fort Stewart phase of the evaluation. This phase of the CEP was conducted 30 May to 23 June 1989 by Armor Test Division, Test And Experimentation Command (TEXCOM) Armor and Engineer Board (ARENBD), and USAARMS Command and Staff Department.

Two variations of the standard scout platoon were tested. The first variation replaces the six M3 Cavalry Fighting Vehicles (CFV) with ten High-Mobility Multipurpose Wheeled Vehicles (HMMWV) and four Military motorcycles (MILMO). The second variation consists of six HMMWV, four CFV, and four MILMO. See the CEP for a complete description of platoons and all associated equipment.

### **4. ISSUE:**

The issue to be analyzed is to determine if the two variations of the scout platoon are logistically supportable. The criterion states that to be supportable, the variations must not generate items of supply, maintenance demand, or military specialty (MOS) requirements not currently available.

## 5. ASSUMPTIONS:

a. That the current scout platoon of six CFV's is supportable with the assets that are available to the battalion.

b. That the mission profile remains the same for both variations as the current scout platoon.

## 6. DATA:

The data collected for the analysis of this issue was collected by means of a questionnaire that was given to the Battalion Executive officer, Maintenance officer, and Supply officer. The questionnaires collected information on maintenance, recovery, and various classes of supply requirements that were influenced by the two variations in the scout platoon. The sixteen questions mainly asked for either a "Yes or No" subjective response with comments. A total of six questionnaires were collected from the two battalions participating in the test. To analyze the responses the data will be classified into three areas, maintenance, logistics, and personnel.

### a. Maintenance:

(1) Repair: The repair of additional HMMWV and the MILMO was listed as a problem by both battalions. The MILMO was listed as a problem because the battalions did not have any mechanics trained to repair them or PLL for their support. This should not be a problem once the MILMO's are issued to the battalions. The 63B's will be trained on the MILMO's and a PLL will be established for them. Both battalions also felt that an additional 63B would be needed to repair the increased number of HMMWV's. Especially if the scout HMMWV's were going to have priority in the battalion over the rest of the wheeled vehicles. However, only the 10 HMMWV platoon would authorize the battalion an additional 63B. Lack of PLL for the additional HMMWV's was mentioned as a problem by both battalions. Again, this problem should go away if the additional vehicles are added to the battalion and the appropriate PLL is established for them.

(2) Recovery: Recovery operations for the scout platoon variations provided a wide range of responses. Decreasing the number of CFV's in the battalion reduced the burden on the heavy recovery capability of the battalion. The increase in HMMWV's placed an increased burden on the wheeled vehicle recovery available. Since the HMMWV's can be recovered by almost any vehicle in the battalion dedicated wheel recovery assets for them should not be required. Also it was noted that self-recovery by other vehicles in the platoon was usually possible, and that a winch mounted on each HMMWV would aid in recovery.

b. Logistics: Changes in consumption rates for Class I, III,

V, and IX between the two variations and the standard six vehicle CFV platoon is shown in table A. All six of the responses felt that support platoon was equipped to handle the supply demand of the variations.

TABLE A. CLASSES OF SUPPLY

RESPONDER	XO	BMO	S-4	XO	BMO	S-4
CLASS I	+15	NA	+15	NC	NC	NC
CLASS III(MOGAS)	+100	NA	+15	NC	+10	+10
CLASS (DIESEL)	-15	NA	-10	NC	-30	-30
CLASS V	NC	NA	+ -	NC	-40	-10
CLASS IX	+20	NA	NA	+60	NC	-10

(percent change  
from base case)

3-7 INF  
(6-HMMWV)  
(4-CFV)  
(4-MILMO)

1-64 AR  
(10-HMMWV)  
(4-MILMO)

(1) Class I: The amount of Class I required for the variations should have remained the same as the amount needed for the standard platoon. The platoon personnel strength is not increased for the two variations.

(2) Class III(MOGAS): The increase in the requirement for MOGAS was a result of adding four MILMO to both tested variations. This is supportable by the battalion as other equipment in the battalion requires MOGAS (generators). The MOGAS for the MILMO is carried in 5 gallon cans stored on the MILMO rack on the rear of HMMWV in the platoon.

(3) Class III(DIESEL): The diesel requirement for both platoons decreased as the number of CFV in the platoon decreased. The variation with four CFV used less diesel than the standard platoon (-15%) and the diesel requirement decreased further for the variation with zero CFV (-30%).

(4) Class V: The questionnaires did not provide much information about Class V. The cargo HEMTT that provides ammunition for the Scout platoon will be able to support the two variations.

(5) Class IX: The Class IX requirement increased in the amount of HMMWV repair parts that were needed, while the amount of CFV repair parts decreased. Since the repair parts for the HMMWV are smaller they are easier to transport forward with the LOGPAC(S-4, 1-64 Inf.). The biggest problem mentioned in the questionnaires was that there was no PLL for the MILMO and that the HMMWV PLL needed to be increased. Both of these problems would be solved

when one of the variations became authorized.

C. PERSONNEL:

(1) Scouts: The personnel requirement remains the same for the two variations as for the standard scout platoon (1-officer, 29-enlisted).

(2) Mechanics: Lack of trained MILMO mechanics was mentioned as the greatest problem in providing maintenance support to the platoon variations. The 63B mechanics would be trained to repair the MILMO if it was added to the Scout platoon. Also the extra HMMWV's increased the work load on the existing wheel vehicle mechanics in both test battalions. However, only the 10 - HMMWV platoon would be authorized an additional wheel mechanic. Utilizing the approved methodology for translating maintenance manhours into required mechanics (AR 570-2) analysis on maintenance manhours shows that there would be a decrease in 63T requirements by one for the 6-HMMWV, 4-CFV variation. The 10-HMMWV variation would decrease the 63T requirements by three and increase the 63B requirements by one.

7. CONCLUSION:

a. Neither variation of the scout platoon generates logistic requirements that can not be satisfied/supported by the current support available in a maneuver battalion.

b. If the 10-HMMWV, 4- MILMO configuration is adopted, an overall savings of two Organizational mechanics would be achieved.



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23 September 2005

MEMORANDUM FOR Defense Technical Information Center,  
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SUBJECT: Distribution Statement - Ballistic Research  
Laboratories Report No. 1883

1. Reference: Ballistic Research Laboratories Report No. 1883,  
"Aerodynamic Characteristics of the 7.62 MM NATO Ammunition  
M-59, M-80, M-61, M-62", by Maynard J. Piddington, March 1967,  
UNCLASSIFIED, AD no. 815788.

2. Subject matter experts and the Army Research Laboratory  
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